ATARI
400/800™

820™ 40 COLUMN PRINTER

SERVICE MANUAL

ATARI®

A Warner Communications Company

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1.1 INTRODUCTION

This 820 Printer Service Manual is a reference guide for the service
technician. The information presented in this manual, when used in
conjunction with ATARI training, will enable a service technician to
install, operate, and maintain the ATARI 820 Printer.

In addition to basic user operating instructions, this manual includes
procedures that describe operating the ATARI 820 Printer in conjunction
with the 400/800 Computer System.

This manual further desciribes the functional operation of the ATARI 820
Printe and provides detailed procedures for its maintenance. ˙ This
information will enable a service technician to troubleshoot and repair
the ATARI 820 Printer to the replaceable integrated circuit level. None
of the procedures included require special test equipment or tools. This
manual also provides spare parts ordering information to replace expended
units and/or assemblies, and the fault reporting procedures required.

1.2 ATARI 820 PRINTER DESCRIPTION

The ATARI 820 Printer provides printout for the ATARI 400 and ATARI 800
Personal Computer Systems. Many combinations of hardware and software
make use of th printer. Application programs provide an option to print
out results whenever appropriate. Basic and Assembly Language Program
Cartridges include printer commands as does the ATARI File Manager and
Disk Operating System (DOS).

1.3 HOW TO USE THIS MANUAL

This manual is organized into six chapters:
Chapter 1 General Information
Chapter 2 Installation
Chapter 3 System Operation

Chapter 4   Functional Description

Chapter 5   Maintenance

Chapter 6   Spare Parts List and Ordering/Reporting
            Information

Each chapter contains only the information needed to fulfill its function. If a given subject applies to more than one chapter, then the subject will be discussed in the chapter where it is most used; other chapters would then refer to the chapter and paragraph containing the subject.

First and second-level paragraphs in the manual contain unique two and three-digit numbers, respectively, in the paragraph heading. The first digit is always the same as the number of the chapter. Third and fourth-level paragraphs contain lower-case letters and numbers in parentheses, respectively, in the paragraph heading. Paragraphs are referenced in text by their number (e.g., 5.4.2 and 5.4.9c).

Figures and tables are numbered sequentially on a chapter basis. The first digit of a figure or table number is always the number of the chapter. Tables appear one time, following their first reference in text. Figures also appear one time after their first reference in text, unless repeating the figure is easier than having the reader refer back.

1.3.1   General Information

This chapter contains general information such as the scope of the manual and how to use the information in it. Also, it provides safety precautions unique to the ATARI 820 Printer operating specifications.

1.3.2   Installation

Chapter 2 contains detailed procedures for unpacking, system set-up and initialization, checkout and repacking.

1.3.3 System Operation

Chapter 3 contains procedures for system power-up, using the
400/800 ATARI Personal Computer with the 820 Printer and some
general programming information.

1.3.4 Functional Description

Chapter 4 provides a functional description of the ATARI 820
Printer. The functional description will be presented using
a functional block diagram discussion to the integrated
circuit level. This information is presented to familiarize
the service technician with the ATARI 820 Printer as a system,
thereby providing him/her with a basis for troubleshooting
system faults.

1.3.5 Maintenance

Chapter 5 presents preventive maintenance, troubleshooting, and
repair instructions. Preventive maintenance includes instructions
for normal cleaning and inspection tasks. The troubleshooting
portion of the chapter presents symptom probable-cause corrective
action types of tables. The repair portion of the chapter
provides instructions for replacing printed circuit assemblies,
whole assemblies, and specific integrated circuits in keeping
with the ATARI maintenance philosophy.

1.3.6 Spare Parts List and Ordering/Reporting Information

Chapter 6 provides ATARI part numbers for the field replaceable
parts. This chapter also provides information for ordering the
parts through the nearest ATARI parts distribution center.

1.4 Changes to this Manual

This manual will periodically be updated to keep it current
with changes in the ATARI 820 Printer system. Changes normally
start with ATARI Customer Support issuing a 'Tech Tips' that
alerts the service technician to such things as changes in
maintenance procedures and critical problem areas. After

either a series of these Tech Tips are issued or one of an
extremely critical nature is issued, service manual change
pages are published. These pages are of the remove-the-old-
and-insert-the-new type. A vertical bar in the margin of the
changed page indicates the revised material. After about
10% of a manual's pages are changed, Customer Support Publications
reissues the entire manual.

1.4.1 Notice of Changes Page

The Notice of Changes page contains instructions for changing
this manual. It will come with pages intended to replace
outdated pages in the manual. The Notice contains the affected
page number and the action required to make the changes. After
making the necessary changes, insert the Notice at the end of
the manual to keep a current record of changes.

1.4.2 List of Effective Pages

The List of Effective Pages on the back of this manual's title
page lists all the pages in this book, including the title page,
the List of Effective Pages, deleted pages, added pages, and
foldout pages.

1.4.3 Reader Comment Form

ATARI Customer Support Publications Department created the
Reader Comment Form (at the back of this manual) to get feed-
back from the service technician about our manuals. If you are
in any way dissatisfied with this publication, we want to hear
from you. Tell us about technically inaccurate information,
gross typographical errors, or missing information. If you
know a way to improve a procedure, please let us know that, too.
When filling out the form, be specific and give the page number
and a line reference with paragraph number, if possible.

1.5 Safety

As with any electronic equipment, precautions consistent with all standard industrial safety practices must be observed while maintianing the ATARI 400/800 Computer Systems. A current of 10 mA can put the human heart in fibrillation and a current of only 100 mA can cause it to stop completely. Since human skin resistance is normally about 300 ohms, any voltage in excess of 30 volts can be lethal.

Notices are included throughot this manual to alert you to problem areas or dangerous situations.

A WARNING statement will precede the text of a procedure that, if not strictly observed, could result in injury or death of the service technician.

A CAUTION statement will precede the text of a procedure that, if not strictly observed, could result in damage to or destruction of equipment hardware or software.

A NOTE statement will highlight an essential operating or maintenance procedure, condition, or clarifying fact. Notes will also be used to provide information that, though not necessary, will be helpful to understanding a concept or competition of a procedure.

1.6 Related Documentation

This service manual provides only that information necessary for a service technician to install, operate, and maintain the ATARI 820 Printer. Other documents pulished by ATARI, other manufacturers, and publishing houses may be helpful to the service technician. The following documents apply directly to the ATARI 400/800 Compute Consoles Systems:

ATARI 400 Operator's Manual	C0 14 76 8
ATARI 800 Operator's Manual	C0 14 76 9
ATARI 810 Disk Drive Operator's Manual	C0 14 760
ATARI 820 Printer Operator's Manual	C0 14 76 2
ATARI 400/800 Basic Reference Manual	C0 15 3 07
ATARI BASIC	C0 143 85

1.7 ATARI 820 Printer Physical Description

The ATARI 820 Printer is a general purpose 40 column printer
with a 6507 on-board microprocessor. Each printer comes standard
with the basic unit, paper, ribbon, data cord, and a built-in power
cord.

On the rear of the unit are two I/O Connectors and fuse holders.
The I/O Connectors are used when the 820 Printer is connected
to the ATARI Personal Computer. The two fuse holders provide
over current, limiting protection for the 120 Vac printer power
and the print head current. (Refer to Figure 1-1) From top
to bottom the switches are:

        Power ON/OFF Switch   - Push up for ON. Push down for OFF.
        Paper Advance Button - Normal open switch, when depressed
                                 advances the paper automatically.

1.8 Specifications
This paragraph provides the operating characteristics and
specifications useful to a service technician for maintaining
the ATARI 820 Printer. All specifications and characteristics
are presented in Table 1-1.

FRONT VIEW

Paper Advance Button - Advances paper automatically.

ON

PWR. **Power ON/OFF Switch**

OFF

PWR.
ON **Power Indicator Light**

BACK VIEW

Fuse - Twist in direction of arrow to remove and replace fuse.

I/O Connectors - Identical jacks accommodate data cords from Console or other peripheral components. Connections may be made in any order with either jack.
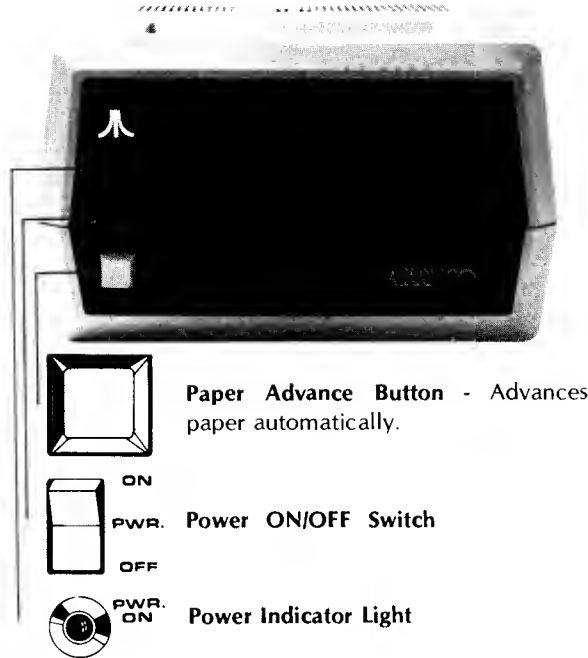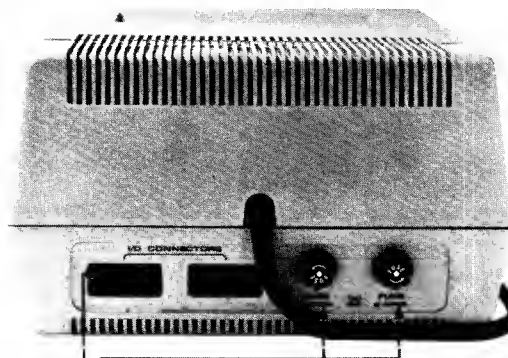
Figure 1-1.   ATARI 820 Printer

Table 1-1. ATARI 820 Specifications

PRINT FORMAT:

  1. Printable Area: 3 1/3" wide
  2. Column Capacity: 40 characters (pitch-12 characters per inch)
  3. Line Spacing: 6 lines per inch nominal
  4. Character Size: Height 0.123" approximately
  5. Start-of-Print Margin Repeatability: ±0.015"
  6. Vertical Line Spacing: Within 1/8 space line to line; cumulative, within 1/2 space per 8"
  7. Horizontal Dot-to-Dot Printing Accuracy (due to head velocity variations): ±10%
  8. Vertical Dot Alignment: ±0.0025"
  9. Font: 5 x 7 dot matrix

PRINT SPEED:

  1. Print Cycle: 800 msec. per line
  2. Print Head Sweep Speed: 10.75 i.p.s. nominal
  3. Dot-to-Dot Cycle Time: 1.3 msec.

PRINT DIRECTION:

  1. Left-to-Right

PRINT CATEGORY:

  1. High resolution impact printer

CHAPTER 2 - ATARI 820 PRINTER INSTALLATION

2.1 Introduction

The following paragraphs provide detailed information and instructions on the following items:

- o Packing List (All items contained in basic unit)
- o Unpacking
- o System Set-Up
- o Check-out

2.2 Packing List

The ATARI 820 Printer comes with all the necessary components to operate the unit with the 400/800 ATARI Computer System. The basic Packing List includes:

- o Printer (with attached Power Cord)
- o Bond Paper Roll
- o Paper Mandrel
- o Ribbon
- o Data Cord
- o Instruction Manual

2.3 Unpacking

Remove the printer with the foam end caps from the box. Remove the foam end caps and polyethylene bag from around the printer. Save all the packing materials for repacking and storage.

Caution
Keep all polyethylene bags away from small children.

Inspect the printer and data cord for any obvious shipping damages. If damage is found note it on the waybill and require the delivery agent to sign the waybill. Notify the transfer company immediately and submit a damage report to the transfer company. Be sure to save the packing material for the transfer company's inspection.

2.4 Connect the AC Power Cord

First check to be sure the power switch is in the OFF position.
Plug the AC Power Cord into any 115 VAC outlet (ordinary house
current).

2.5 Connect Data Cord

The ATARI 820 Printer is only one of many peripheral devices used
with the ATARI 400/800 Computer System. For this reason, there
are three possible ways of connecting the data cord into the
system. Refer to precedure which describes your system:

    Printer & 400/800 Computer Console Only
    Turn the printer such that the rear of the unit is facing
    you. Notice the two I/O Connectors on the lower left side.
    Connect one end of the data cord into either connector and
    reposition the printer. Connect the free end of the data
    cord into the peripheral connector on the side of the
    400/800 Computer Console. (Refer to Figure 2-1.)

    Printer & 410 Recorder & 400/800 Computer System
    Turn the printer such that the rear of the unit is facing
    you. Notice the two I/O Connectors in the lower left side
    Connect one end of the data cord into either I/O connector
    and reposition the printer. Connect the free end of the
    data cord into the peripheral connector on the side of the
    400/800 Computer Console. Connect the data cord from the
    410 Recorder into the open connector on rear of the 820
    Printer.

    Mulit Pheripheral Devices & 400/800 Computer System (Daisy Chain)
    The I/O Connectors on the rear of each device are identical.
    This allows the devices to be connected in any desired
    order. Arrange the devices in the order desired allowing
    access to the I/O Connectors on the lower rear of each
    device. Connect the first data cord onto the peripheral
    connector on the side of the 400/800 Console. Connect
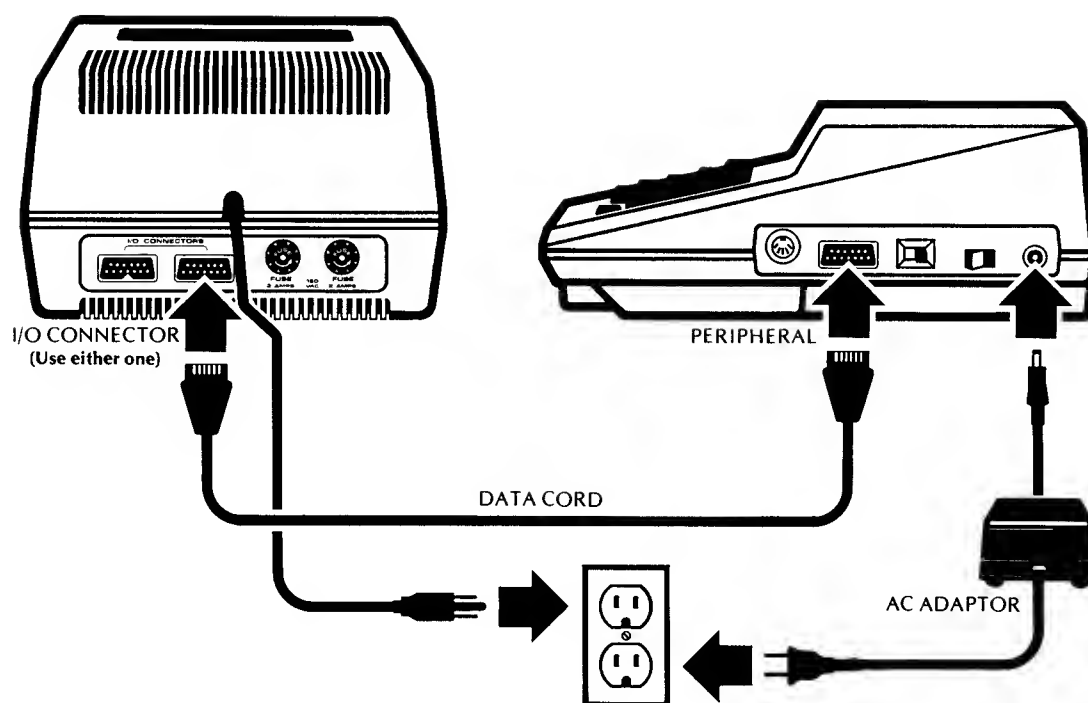
Figure 2-1. ATARI Printer Cable Connection

the free end of the data cord into the I/O Connector on the
first device (should be nearest the 400/800 Console).
Connect one end of a second data cord into the open I/O
Connector on the first device and the other end into the
second device. Repeat this procedure for each device
remaining, until all devices are connected. If the 410
recorder is used in the system configuration, this should be
the last device in the series.

The above procedure for connecting Multi-Peripheral Devices
is referred to as "Daisy Chaining". This means the bus line
(data cords) is interconnected with each unit in such a way
that the signal passes from one unit to the next in a serial
fashion.
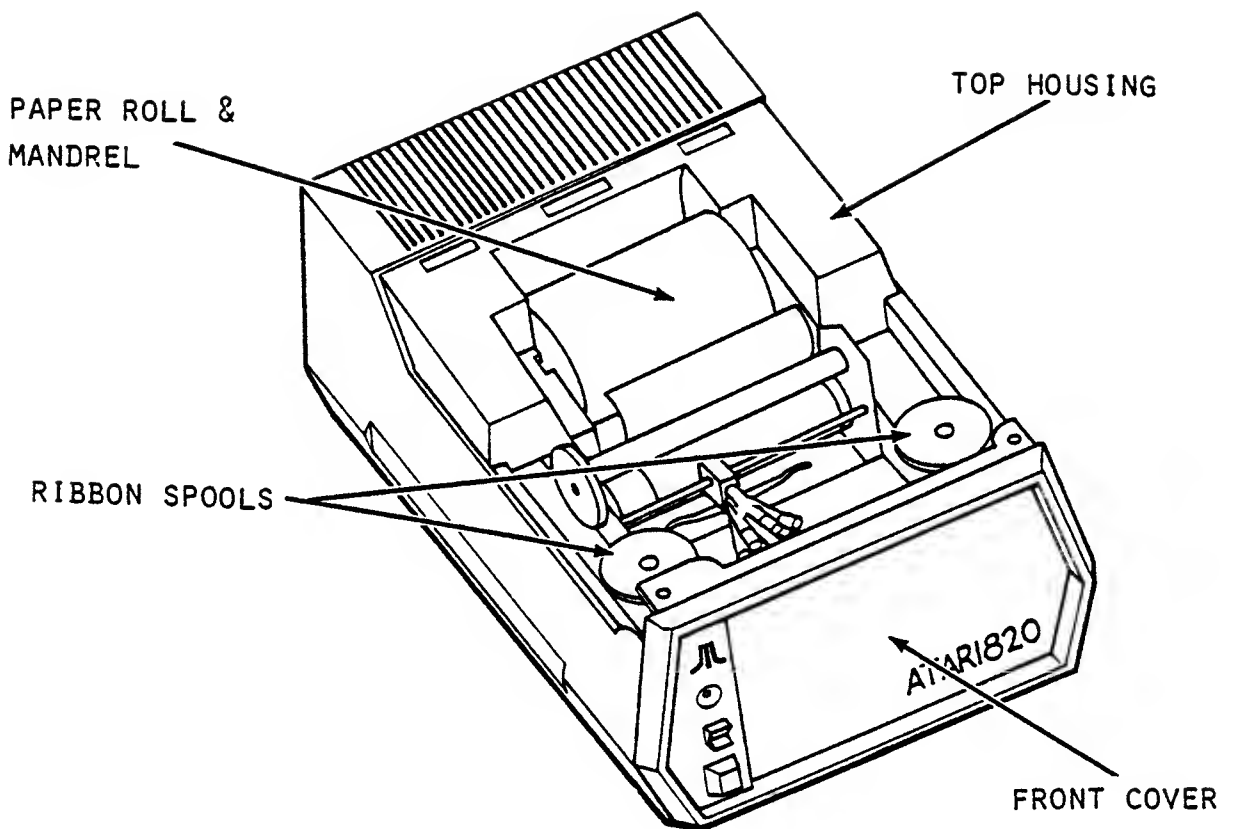
Figure 2-2. Top Housing Cover Removed

2.6 Check Ribbon Spool and Paper Roll

Handling during shipping will sometimes jar the ribbon spool
or paper roll-out. Care should be taken to check both items
for proper installation in the system. (Refer to Figure 2-2)

Remove the top cover from the printer exposing the paper roll
and ribbon spool. To be sure the ribbon is installed
correctly refer to the maintenance section paragraph 5.13.
Finally, advance the paper about three inches with the manual
paper advance in a counterclockwise direction. If the paper
fails to advance with moderate pressure, refer to the mainten-
ance section paragraph 5.14.

After both items have been checked, place the top cover back
on the printer. Be sure the end of the paper is not pinched
under the top cover.

CHAPTER 3 - SYSTEM OPERATION

3.1 Introduction

This chapter will cover the procedures required to power-up the ATARI 820 Printer, system power-up, printer commands and printer "Timeout".

3.2 Printer Power-Up

Before powering up the printer, ensure that you have unpacked and set up the system according to the instructions outlined in Chapter 2, Printer Installation. The following steps should be used when powering up the printer.

3.2.1 Power ON/OFF Switch

With the printer configured in the system, place the Power ON/OFF switch in the ON position. Observe that the Power ON Indicator (LED) is luminated at this time.

3.2.2 Paper Advance Switch

Before printing begins the print head should be in the "home" position. Advance the paper one line, presing the Paper Advance switch. When the head stops in the home position, the unit is now ready to use.

3.3 System Power-Up

This section will cover two of the existing power-up procedures used by the ATARI 400/800 Personal Computer System. If any problems should occur during either procedure refer to the 400/800 Device Manual or 810 Floppy Disk Drive Manual. Both of the following procedures allow access to the 820 Printer to perform system operations.

3.3.1 System Power-Up Without Disk Drive

The following details the procedures required to power-up an
ATARI 400 or 800 Computer Console without a Floppy Disk Drive.
This procedure assumes that the system has been set up according
to the 400/800 Device Manual, Chapter 2, and the BASIC Cartridge
is inserted in the console.

To power-up the 400 or 800 Computer Console rquires that the
system be connected to all devices correctly, and the console
Power ON/OFF switch is set ot "ON" position. After a few
seconds, the BASIC Cartridge prompts you with a "Ready" written
on the screen.

3.3.2 System Power-Up With Disk Drive

1. Connect the system devices according to the instructions
   outlined in each of their respective Operator Manuals.

2. Power-up the peripheral devices according to the instructions
   in each of their respective Operator Manuals.

3. When Busy Indicator (LED) turns off, insert the Master
   Diskette (Disk File Manager) into the Floppy Disk Drive No. 1,
   and close disk door.

4. If applicable insert the BASIC Program Cartridge into the
   Cartridge Slot and close cartridge door.

5. Set the Power ON/OFF switch to the "ON" position on the
   400/800 console. The system automatically "boots" the program
   from the Master Diskette.

6. The prompt that appears on the screen will depend upon the
   BASIC Program Cartridge or lack of BASIC Cartridge. With a
   BASIC Program Cartridge inserted, the screen will prompt
   "Ready" and without the BASIC Program Cartridge, the screen
   will prompt the DOS Menu.

3.4 Printer Commands

Each version of software, whether cartridge, cassette, or
diskette based, will have its own commands for activating the
printer. Consult the appropriate software manual the correct
printer commands.

3.5 L Print Command

This command is used with the Basic Cartridge inserted in the console. This statement causes the computer to print data on the line printer rather than on the screen. It can be used in either Direct or Defined modes (Refer to ATARI Reference Manual).

Format: L Print "Expression"
Example: L Print "Print to 820 Printer"

The above expression "Print to 820 Printer" will be output to the printer in direct mode.

3.6 Printer Quick Check Program

In the maintenance section of this manual you will find a printer test which can be loaded into the computer system to check the printer. The opposite page shows an example of th printout after the test is run. You might also notice the use of the L Print Command in the program for programming purposes. The BASIC program Cartridge must be inserted in the console when the program is loaded.

3.7 Printer Timeout

In order to prevent overheating, the 820 Printer is equipped with an automatic timeout cycle, which halts printing for approximately three seconds. During continous use you will notice that the printer stops periodically and then continues. Frequent timeouts indicate that the printer is operating correctly. Any attempt to override the timeout period is likely to damage the printer.

CHAPTER 4 - FUNCTIONAL DESCRIPTION

4.1 Introduction

This chapter will cover the basic functions of the ATARI 820
Printer. The first sections will be devoted to the four basic
print mechanisms. The final sections will cover the electronic
function and the devices which perform these functions.

4.2 Printer Mechanism

The ATARI 820 Printer consists of four basic mechanisms which
work in conjunction with an "on-board" computer system. The
following subsections detail each of the basic mechanisms.

4.2.1 Printer Drive Mechanism

The 820 Printer Drive Mechanism is used to drive the print
head across the print area and return the print head to its
home positions. The operation consists of the following
components: (Refer to Figure 4-1)

- o Drive Motor - The drive motor is energized whenever
  a paper advance operation or print operation is
  performed.

- o Drive Cam - The eliptically slotted cam drives the
  print head across the print areas and returns the
  head to the home position.

- o Print OK Microswitch - The Print OK switch provides
  feedback when the print head has entered the print
  area and when it has returned to the home position.

Other parts of the print drive mechanism include the cam pulley,
drive motor pulley and belt.

4.2.2 Paper Feed Mechanism

The paper feed mechanism works in conjunction with the print
drive mechanism. For each complete revolution of the drive
cam, the paper is advanced one line. The paper feed mechanism
consists of the following:
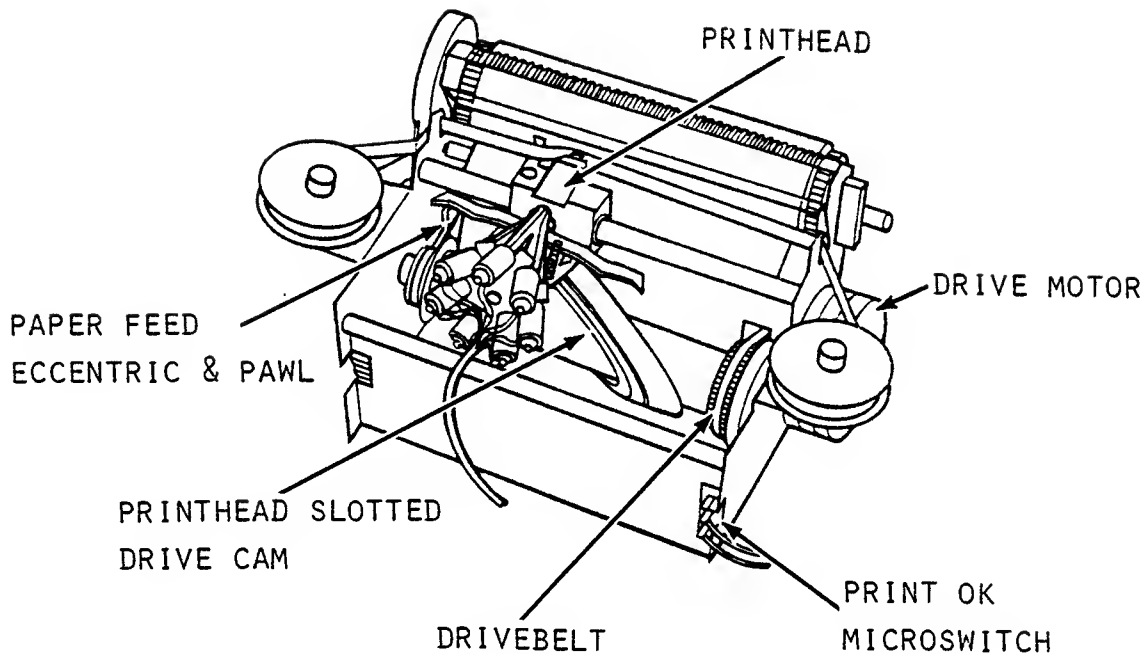
Figure 4-1. Print Mechanism-Front View

o   Paper Feed Eccentric - Connects to the drive cam to operate
    the Paper Feed Pawl. (Refer to Figure 4-1.)

o   Paper Feed Pawl - Moves in forward direction engaging the
    ratchet teeth on the left side of the platen, pulling the
    platen in a counterclockwise direction.

o   Pressure Roller - (located under the platen) Provides an
    upward pressure holding the paper to the platen. As the
    platen turns, the paper is pulled along advancing one
    line.

4.2.3   Ribbon Mechanism

The ribbon mechanism advances the take-up spool after each print
or linefeed operation. The operation of the ribbon mechanism
consists of the following:

o   Ribbon Feed Pawl - The feed pawl, located on the print head
    is a slender gray lever containing a pawl on each end.
    The movement of the head assembly causes the pawl to
    engage one of the ribbon spool's ratchet teeth, forcing
    the spool to turn. When the supply spool runs out of
    ribbon, the ribbon feed pawl is forced to shift position
    by the movement of the head assembly.

o   Two Ribbon Spools - Beneath each spool is a set of ratchet
    teeth which engage the feed pawl, turning the take-up
    spool.

RIBBON

PRINT WIRE

PAPER

SOLENOID

GUIDEBAR
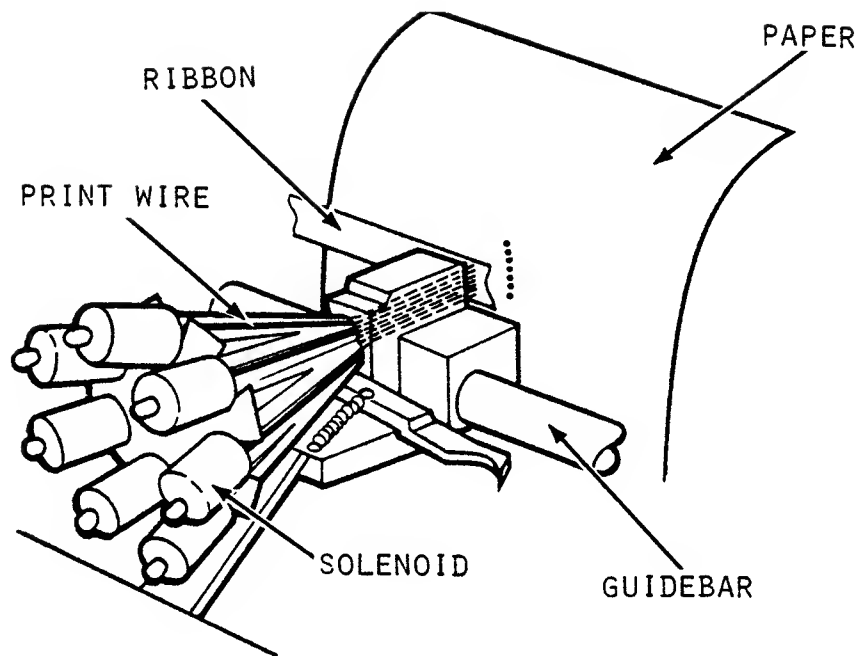
Figure 4-2. Print Head Assembly

o Two Ribbon Feed Pawl Springs - The springs hold the lever
   attached to the head assembly such that it may rest in
   either one of two positions.

4.2.4 Print Head Mechanism

The print head consists of seven print solenoids, arranged so
that the solenoid hammers form a vertical bar. The top hammer
corresponds to the number one position and the lower-most hammer
corresponds to solenoid number seven. (Refer to Figure 4-2.)

4.3 Electronics

The electronics located on the Main Printed Circuit Board (PCB)
is divided into the following major areas:

o Central Processing Unit
o Power Supply
o Amplifier/Driver Interface
o Data Transfer
o Miscellaneous Circuits

Refer to th system block diagram Figure 4-3 as each of these
areas are reviewed.

4.4   Central Processing Unit

The ATARI Printer features an "on-board" microprocessor which
controls all the printer functions except data transfers. The
Central processor consists of four elements which will be
discussed in the following sections.

4.4.1   Basic Operation

The central processing unit is a system which can be character-
ized as very simple in design and very complex in its overall
operation. It carries out rather complex tasks by performing a
large number of simple operations. Control of the central
processing unit is the primary responsibility of the micropro-
cessor. By putting addresses out to the program memory (ROM) and
receiving instructions in return, the microprocessor can control
the sequence of operations performed. The processor causes the
system to perform the desired operation by reading an instruction
(specific bit pattern) and executing that instruction. It then
goes to the next instruction in the program and executes it.
This simple operation of fetching and executing each instruction
brings about the desired system operation.

4.4.2 6507 - Microprocessor

The 6507 is a self-contained microcomputer system fabricated
on a single chip. The address bus, the bi-directional data
bus, and the Read/Write line allow the processor to exercise
direct control over the central processing system. The address
bus puts out addresses to control the source or destination of
data transfers. These addresses are derived from various
sources within the microprocessor. During the instruction cycle
from program memory (ROM) the addresses are usually derived from
the program counter which controls the execution of sequential
instructions. Addresses for data transfers between the
microprocessor and the RAM memory are usually derived from

Figure 4-3. 820 Printer Block Diagram

one of two sources; directly from the program memory or calculated by the microprocessor in the normal operation.

The bi-directional data bus serves as a parallel path for data transfer in and out of the microprocessor. The direction which data transfer occurs is determined by the Read/$\overline{\text{Write}}$ Line.

The 6507 used in the ATARI 820 Printer has the following functions:

- o Monitoring the PIA for data transfers from the 400/800 Computer and status within the printer
- o Notifying the 400/800 Computer of the receipt and correctness of input data
- o Decoding of information to be printed and determining the dot matrix pattern to use
- o Housekeeping
- o Activating the Drive Motor Logic
- 0 Activating the Amplifier/Drivers Logic

4.4.3 Clock

The clock generator produces a continuous waveform which is used to control all signal transitions in the system. The clock acts as the heart of the system, providing timing controls for the central processing unit. The clock cycle is divided into two equal parts. The first half of the clock cycle is used to put the address on the address bus. The second half of the clock cycle is used to transfer data on the data bus. The 820 Printer uses a 1 MH crystal clock to provide its timing control.

4.4.4 ROM (Read Only Memory)

As the name implies, this memory may only be read from and not written into. The ROM stores the sequence of instruction which comprises the system program. Like any device in the system the ROM puts a pattern of 1's and 0's on the data bus in response to the address received from the microprocessor. Each unique address selects a set of 8 binary bits and places the

byte on the data bus. An important characteristic of most
ROM Chips is that, the information is stored on a permanent
basis. When the power is removed the information is not
lost. The ROM used in the central processing unit simply
holds the operating program for the microprocessor.

4.4.5   6532 - Peripheral Interface Adapter (PIA)

The 6532 PIA is an Input/Output device which acts as an interface
between the microprocessor and system functions. The MPU
communicates with the PIA through 8 data lines connected to
the data bus. Communication is initiated by the MPU using
its address lines to select or address the PIA.

To communicate with the 400/800 Computer Console and perform
desired system functions, the PIA provides 16 programmable port
lines. Each port line or group of port lines may be programmed
by the MPU to serve a particular function. The 16 pins are
divided into 2 eight bit ports, PAO-PA7 and PBO-PB7. PA7
may also function as an interrupt input pin. The port lines
are also bidirectional, meaning they can be programmed for either
input or output. When a "O" is stored in any bit of the data
direction register the corresponding port line is used to
input data. When a "1" is stored in the data direction register
the corresponding port line is used to output data.

Two other functions of the 6532 PIA is an internal timer which
can be programmed for use by the MPU. The last function is
a 128 bytes of RAM memory which may be used by the MPU for date
storage.   (Refer to Figure 4-4)

The PIA serves the MPU in the following interface capacities:
- o   Data Storage for Microprocessor
- o   Monitoring the status of the Paper Advance and Print
     OK Logic
- o   Communications interface between the 400/800 Computer
     and the Microprocessor
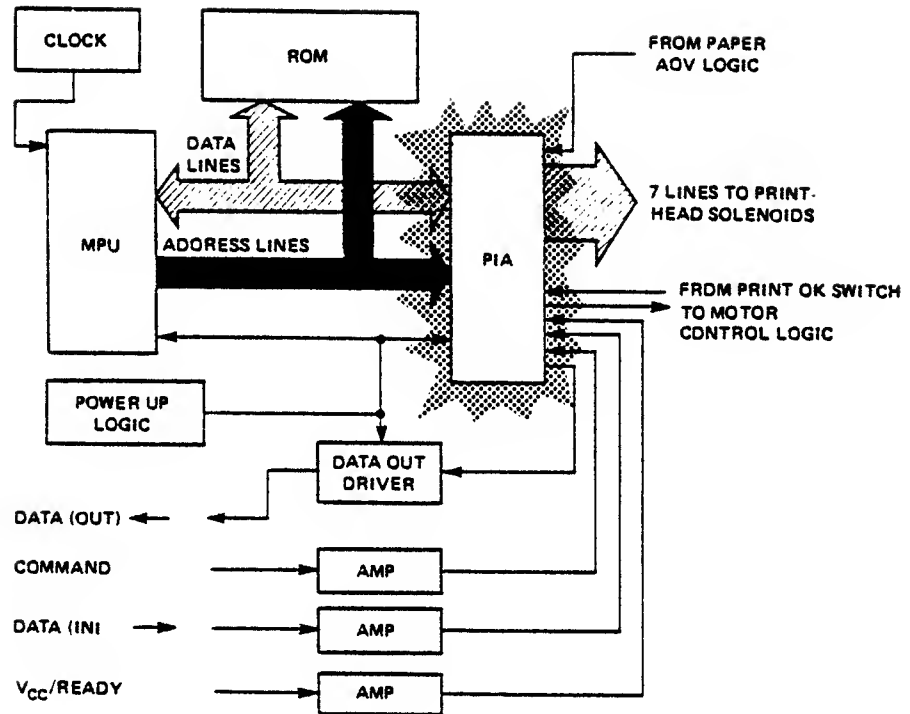
Figure 4-4. PIA-Interface System Function

o   Activating the Drive Motor Logic

o   Activating selected Amplifier/Drivers during print
    operation

4.5 Power Supply

The power supply provides the following voltages for use in the
system: (Refer to Figure 4-5 Block Diagram)

     120 Vac
     +40 Vda (Unregulated)
     +12 Vdc (Unregulated)
     +5 Vdc (Regulated)

The 120 Vac applied to the transformer primary is also applied
to the AC Motor. The two secondary windings are applied to
full wave bridge rectifiers. One bridge develops the +40 Vdc
for the print head solenoids and the other bridge develops the
+12 Vdc for the solid state relay and Paper Advance switch.
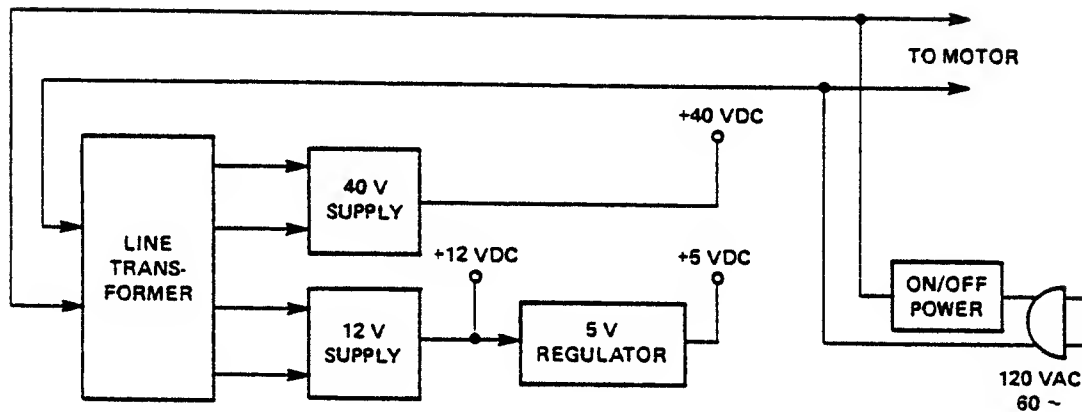
Figure 4-5. Printer Power Supply Block Diagram

The +12 Vdc is also applied to a voltage regulator developing the +5Vdc for the integrated circuits system.

4.6 Amplifier/Driver Interface

The print head, which is driven at a constant speed by the printer drive mechanism requires no special feedback to provide proper timing between print pulses. A longer time between pulses will generate a wider character.

The ATARI 820 Printer uses a 5 x 7 character font shown in Figure 4.6. With a one "dot time" space between characters the dot to dot elapsed time is 1.3 milliseconds for a 40 character line. Refer to Figure 4.7 for an approximation of the print timing.

The Amplifier/Driver circuit performs two functions. It first sinks the approximately 3.6 amps required to activate the solenoids and quickly removes the stored energy in the solenoid when the solenoid is turned off. Refer to Figure 4.8 for the Current Waveform to drive the solenoid. The Amplifier/Driver are activated by the PIA for each dot print function. (Refer to Figure 4-3)

.0176" approx.

5×7 DOT MATRIX FONT

.0166" approx.
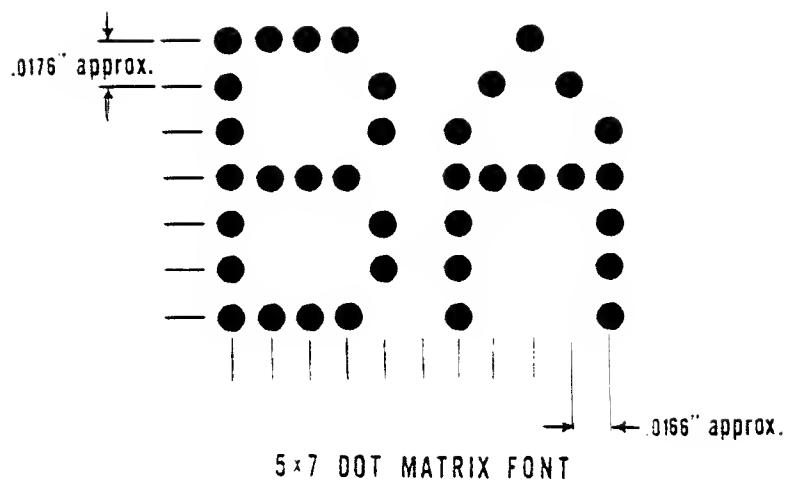
Figure 4-6.   Character Font

3.0A TO 3.6A

400us

900us

100us

(CURRENT DECAY TIME
100% TO 0%)
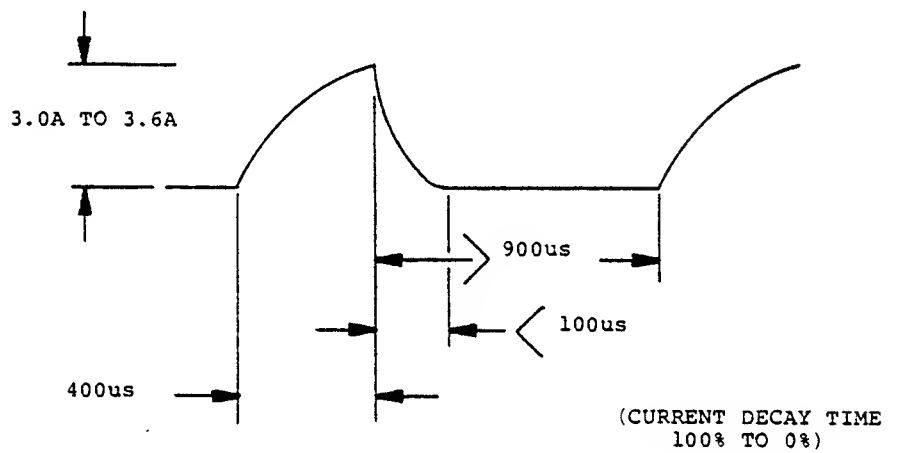
Figure 4-8.   Current Waveform

MOTOR
CONTROL LINE
(PIA-PAO)

1.25 LINES/SEC

PRINT
OK SWITCH
(PIA-PBO)

PRINT READY   HOME

PRINT
AREA

160-190MS   310 MS

800 MS
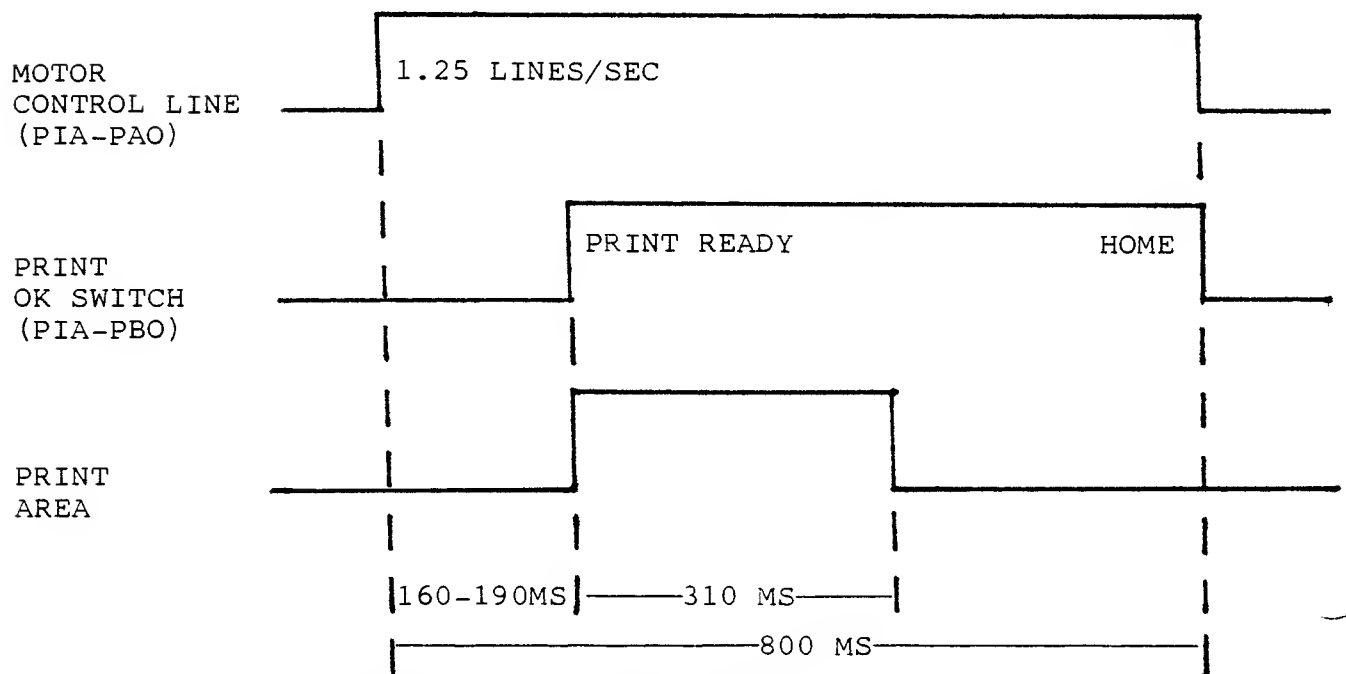
Figure 4-7.   Print Timing

4.7 Data Transfer

Communication between the 400/800 Computer and the printer is
originated by the command line to the printer going low. The
computer console sends a command frame on the DATA OUT line
to the printer.

The command frame format consists of the following information:

> 1 byte = Serial Bus Device ID
> 1 byte = Command
> 2 bytes= Auxiliary Information
> 1 byte = Checksum

Following the command frame is an optional data frame which may
originate at the computer console or the printer. The bus
timing for data transfers are illustrated in Figure 4-9. The
following sections cover the Write and Status Commands and the
Control Character.

4.7.1 Write Command

The command frame format for the write operation contains the
following information:

> o   Serial Bus Device ID
>   Printer ID = 40_{16}
>
> o   Command
>   Write = 57_{16}
>
> o   Auxiliary Bytes 1
>   Normal Print (40 Char/Line) = $4E_{16}$
>   Sideways Print (16 Char/Line) = 53_{16}
>
> o   Auxiliary Byte 2
>   Not used by the printer

The printer WRITE DATA frame contains either 29 data bytes plus
a checksum byte, or 40 data bytes plus a checksum, depending
upon the value of auxilary byte 1.

4.7.2 Status Request Command

The command frame for the STATUS REQUEST contains the following
information:

- o Serial Bus Device ID
  Printer ID = 40_{16}

- o Command
  Status = 53_{16}

- o Auxiliary bytes not used

The printer controller will return a data frame to the computer
reflecting the status. The STATUS DATA frame is shown below:

DONE/ERROR
FLAG
AUX. BYTE 1 from last WRITE COMMAND
DATA WRITE TIMEOUT
CHECKSUM

The FLAG byte contains information relating to the most recent
command prior to the status request and some controller constants.
The DATA WRITE Timeout equals the maximum time to print a
line of data assuming worst case controller produced Timeout
delay. This Timeout is associated with printer timeout
discussed earlier.

INTENTIONALLY BLANK

4.7.3 Control Characters

The following are the codes for the control characters:

Control Character	Code (HEX)
ACK	41
NAK	4E
Complete	43
ERROR	45

4.8 Miscellaneous Circuits

4.8.1 Paper Advance Button

A line feed operation occurs each time the button is pushed.

4.8.2 Print OK Switch

Informs the MPU when it is positioned over the print area and when the print head has returned to the home position.

4.8.3 Power Up Logic

This gating holds the reset line low until the power supply stablizes, and then allows the MPU and PIA to power up.

CHAPTER 5 - MAINTENANCE

5.1 Introduction

The following paragraphs provide instructions on the proper
care and maintenance of the 820 Printer. Included will be
a section on preventive maintenance, covering normal cleaning
and inspection; a section on troubleshooting the 820 Printer
and a section containing disassembly and assembly instructions.

NOTE

Metal-Oxide-Silicon/Field Effect Transistors (MOS/FET)
can be damaged by static charges in their plastic
packaging or by handling in normal work environments.
It is necessary to establish a static-free work station.
A work station for assembling static-sensitive materials
should consist of an anti-stat poly table cover that is
grounded to the metal on the table. In addition, the
worker at the station should also be grounded, with a
wrist strap, to the metal portion of the table. Note
that the wrist grounding straps affect only the body of
the service person, not the clothing. Therefore, short
sleeves are preferred. If long sleeves are worn, they
should be covered by an anti-stat gauntlet.

On static-senitive work surfaces, all plastics except
anti-static ones should be forbidden. Vinyl or mylar
shop carriers pulled from a stack and laid casually
on a board can destroy it. Styene desoldering devices
generate large static charges, particularly when triggered.
Practically all plastic and plastic related materials
generate tremendous charges and should not be permitted
in the same room where static-sensitive devices are
being assembled or stored.

5.2   Preventive Maintenance

The frequency of normal maintenance (cleaning, lubrication and inspection) should be performed every 12 months if the printer is installed in a clean environment. However, if the printer is subjected to heavy usage and/or a dirty environment, the frequency should be increased as required.

5.2.1   Printer Cleaning and Lubrication

The following steps detail the procedures required to clean, lubricate and inspect the printer once the top housing cover, paper roll and top housing is removed. Refer to paragraph 5.15.1 for disassembly instructions and paragraph 5.16.3 for assembly instructions.

Tools Required:
- o   Dust free cloth
- o   Isopropyl alcohol
- o   Cotton swabs
- o   Grease (IBM #23 or Lubriplate #70)

Cleaning:
1.   Moisten the dust free cloth in the isopropyl alcohol for cleaning the printer.
2.   Wipe the print mechanism and top housing assembly thoroughly, removing hardened grease, ink and dirt.

NOTE

Use the cotton swabs dipped in isopropyl alcohol to clean areas that cannot be reached with dust free cloth.

3.   Rotate platen and clean with an alcohol soaked, dust free cloth.

4. Remove the two hex screws on each side of the printer mechanism holding the print head and head shaft.

5. Clean the head and head shaft with the alcohol soaked, dust free cloth.

6. Reassemble the print head and head shaft.

7. When the print head has been disassembled the head to platen air gap needs to be adjusted. Refer to Head Alignment Procedure, paragraph 5.9.

Lubrication:

1. Using one of the recommended lubricants, the following areas should require lubrication after cleaning:

   o Head shaft

   o Groove in main drive cam

   o Guide in extrusion in which the "tail" of the print head travels

   o Paper feed cam and pawl

   o Ribbon feed pawl

   o Platen detent teeth

   o Platen ratchet teeth

   o Pressure roll release lever

2. Use only a small amount of lubricant; enough to create a film is needed in each location.

5.2.2 Visual Inspection

As part of the preventive maintenance procedures and normal repair routine, a visual inspection of the printer should be made for damage and abuse.

1. Check for print wire movement on all seven solenoids by depressing paper advance and noting return to rest position.

2. Check for easy movement of the head assembly on the print head assembly shaft.

3. Inspect the ribbon reverse mechanism for proper movement. Manually operate the ribbon feed pawl back and forth to check operation. Be sure that both springs are securely in place and of equal tension.

4. Inspect the printer for any loose or missing screws.

5. Rotate the drive cam toward the platen and listen

for an audible click of the Print OK switch.

    a. The position of the switch arm roller at the click should be half-way up/down the high dwell ramp of the cam.

    b. The switch activating arm should be straight with no kinks.

6. Check that the right end of the print platen is not loose with regard to the platen drum.

7. Check that the platen spins freely when the paper release lever is depressed and ratchet pawl disengaged.

8. Check that the plastic paper guide strip edge touches the platen drum through its entire length.

9. Check that the plastic paper guide strip edge is secured to the extrusion mounting surface.

10. Check that the print head moves freely along its shaft and within the drive cam groove while turning the drive cam toward the platen.

11. Set the ribbon in place and check that it does not snag throughout its path. Check the ribbon spool drag.

12. Check that the paper guides are not loose on main frame extrusion and that they may be moved with moderate pressure for adjustment.

13. Check that all the cables are dressed and secured. Check that no interference will exist in the moving mechanism.

5.3 System Check-Out

The following paragraphs detail the standard check-out procedures used to determine the operational status of the 820 Printer. Use the flowchart, Figure 5-1, as a guide to system check-out and troubleshooting the Printer.

5.3.1 Operator Interactive Test

This test is intended to verify that the unit powers up and the paper advance operates properly. The printer does not have to be connected to the 400/800 Computer Systems to conduct this test.
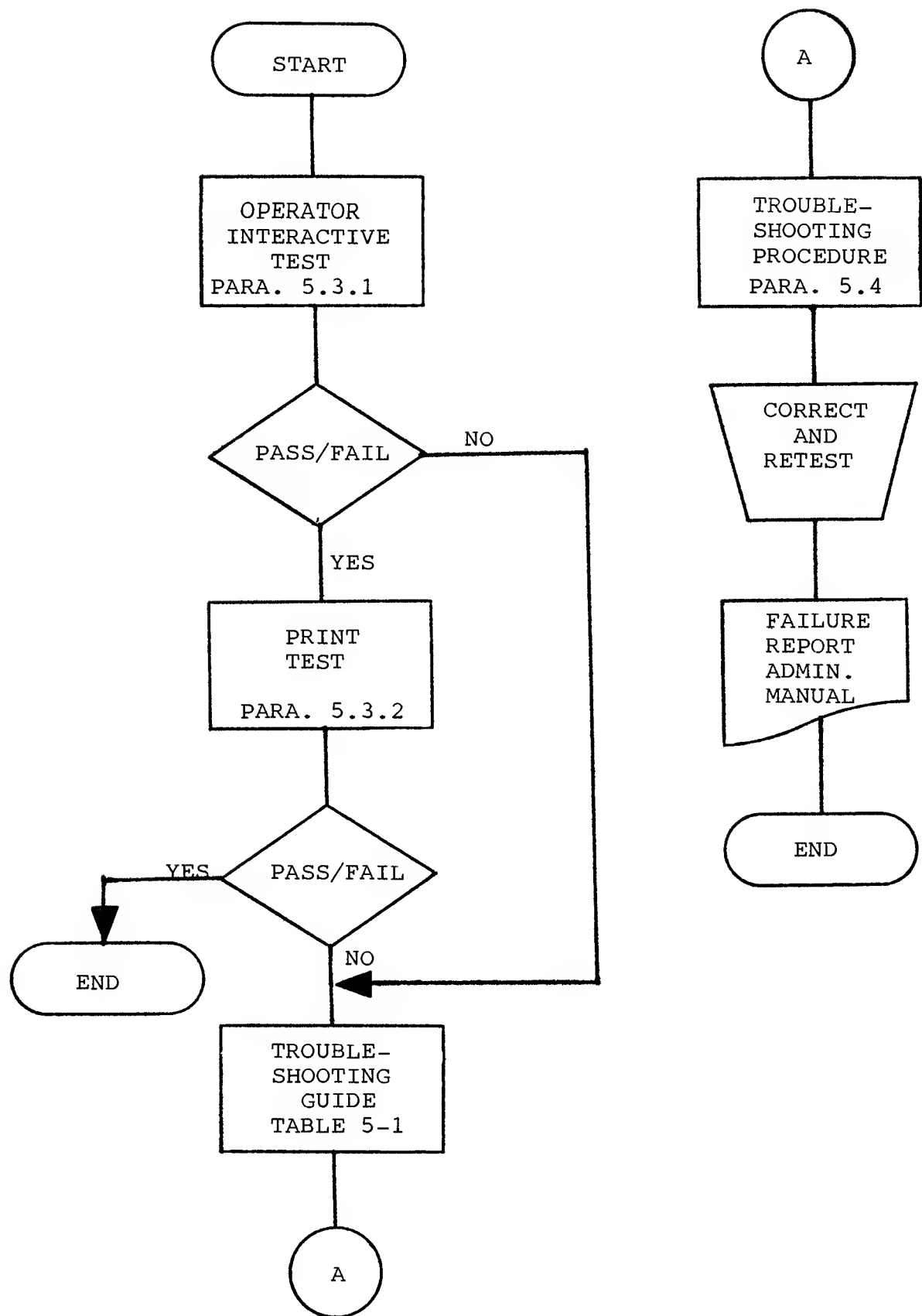
FIGURE 5-1.   PRINTER TROUBLESHOOTING FLOWCHART

Procedure:

1. Plug AC power cord in 115Vac outlet if not already connected to system.

2. Remove top housing cover exposing print head and paper roll.

3. If the printer ribbon shows excessive wear or fraying, replace before continuing test. Refer to Ribbon Installation, paragraph 5.13.

4. Check paper roll for proper installation and low paper. If paper needs replacement, refer to Paper Installation, paragraph 5.14.

5. Power-up the unit by turning the Power ON/OFF switch to the "ON" position.

6. Observe that the power indicator is illuminated at this time. Perform step 7 to verify that the power indicator is not burned out.

7. Push the paper advance button observing the following conditions:

   o The print head moves across the head shaft and returns to the home position.

   o The paper advances one line each time the button is pressed.

If the printer does not respond correctly to the above procedures, refer to the Troubleshooting Procedures, paragraph 5.4.

5.3.2 Print Test

This test verifies the print functions of the 820 Printer. Complete the Operator Interactive Test before proceeding with this test. To perform this test, the printer needs to be connected to the 400/800 Computer System. (Refer to Chapter 2 for installation procedures). If any failures occur during this test refer to the Troubleshooting Procedure, paragraph 5.4.

Tools Required:

   o Copy of "Printer Quick Check Program"

NOTE

ATARI provides a printed copy of the "Printer Quick Check Program". ATARI suggests that a copy be made on either tape or disk for further reference.

Procedure:

1. Set system Power ON/OFF switch to "OFF" position on the 400/800 Computer console.

2. Open Program Cartridge door an insert BASIC Program Cartridge in left cartridge slot (800 Console only, 400 Console only has one cartridge slot). Close Program Cartridge door.

3. Set system Power ON/OFF switch to "ON" position.

4. Load "Printer Quick Check Program" by media selected for storing program. (Refer to Figure 5-2.)

5. Run printer program.

6. Wait for test to be completely run by the 400/800 Computer. When the test is complete the printer will print "End of Printer Quick Check".

7. Advance the paper until the sample print out is above the tear off blade.

8. Tear the sample print out off the roll and check for the following conditions (Refer to Figure 5-3):

   o Print all 26 letters of the alphabet in both upper and lower case

   o Print alphanumeric symbols

   o Print a full 40 character line, terminating in an automatic line advance

   o Maintain column linerarity down several lines of print

   o Provide single and multiple line paper advance

   o Produce multiple repetitions of the same character without any noticeable reduction of print quality

   o Check for missing dots

5.4   Troubleshooting Procedure

This procedure in conjunction with Table 5-1, Troubleshooting Guide is used to isolate most failures in the printer. Table 5-1 provides the most probable cause or causes of the failure and suggests corrective action. You may use the following troubleshooting steps to shotgun the problem or move directly to the step suggested by Table 5-1.

Figure 5-2.

PRINTER QUICK CHECK PROGRAM

PUT 6 SPACES HERE

```
10 LPRINT "       ATARI 820 PRINTER QUICK
CHECK"
20 LPRINT
30 LPRINT
40 LPRINT "ABCDEFGHIJKLMNOPQRSTUVWXYZ"
50 LPRINT "abcdefghijklmnopqrstuvwxyz"
60 LPRINT "0123456789"
70 LPRINT ". , ; : ? ! $ ( ) + - * / = <
 > ^ \ | _ # % & ' @ ] ["
80 LPRINT "ABCDEFGHIJKLMNOPQRSTUVWXYZABC
DEFGHIJKLMNOPQRSTUVWXYZ"
90 LPRINT "ABCDEFGHIJKLMNOPQRSTUVWXYZABC
DEFGHIJKLMN"
100 LPRINT
110 FOR H=1 TO 18
120 LPRINT "HELLO     ATARI    820   PRIN
TER     USER";:NEXT H


130 FOR B=1 TO 6
140 LPRINT
150 NEXT B
160 TH=1
170 DIM T$(36)
180 DIM TS$(40)
190 T$="ABCDEFGHIJKLMNOPQRSTUVWXYZ123456
7890"
200 PASS=PASS+1
210 FOR X=1 TO 36
220 FOR Y=1 TO 39
230 TS$(Y,Y)=T$(X,X)
240 NEXT Y
250 LPRINT TS$
260 NEXT X
270 LPRINT T$
280 LPRINT T$
290 ? "        PASS";PASS
295 LPRINT
300 LPRINT "          END OF PRINTER QUICK
CHECK"
```

PUT 4 SPACES HERE

PUT 2 SPACES HERE

PUT 5 SPACES HERE

PUT 8 SPACES HERE

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789
. , ; : ? ! $ ( ) + - * / = < > ^ \ | _
# % & ' @ ] [                         `
ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMN
OPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMN
```

```
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
HELLO     ATARI     820   PRINTER     USER
```

THIS IS A SAMPLE OF THE
PRINT OUT YOU SHOULD GET
WHEN USING THE "Quick Check"
PROGRAM.

```
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
JJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJ
KKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKK
LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
1111111111111111111111111111111111111111
2222222222222222222222222222222222222222
3333333333333333333333333333333333333333
4444444444444444444444444444444444444444
5555555555555555555555555555555555555555
6666666666666666666666666666666666666666
7777777777777777777777777777777777777777
8888888888888888888888888888888888888888
9999999999999999999999999999999999999999
0000000000000000000000000000000000000000
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890
```

END OF PRINTER QUICK CHECK

Figure 5-3.   Sample Print Out

The following is a list of guidelines to aid in troubleshooting of the system:

   o Use only known good components for substitution.

   o Retest the system after each component is substituted.

   o Ensure that the system power is off and unplugged before replacing any component.

   o When replacing the IC's leave the substituted chips in the main PCB until all chips have been replaced.

   Repair Procedure:

1. Check both fuses on the back of the printer. Replace either or both fuses if bad.

                              NOTE

      Always replace any bad fuse with one that has
   the same electrical rate - 2AMP, Type 3 AG.

2. Disassemble the top housing using the instructions outlined in paragraph 5.15.1.

3. Visually inspect all connectors to insure that none are open or are making partial contact. Inspect the fuse holders for any break or damage.

4. Replace each chip on the main PCB using the instructions outlined in paragraph 5.5.

5. Replace the transformer using the instructions outlined in paragraph 5.6.

6. Replace the main PCB using the instructions outlined in paragraph 5.7.

7. Replace the switch PCB and harness by removing the harness on holder and install the new switch PCB.

8. Adjust the Drive Belt tension using the instructions outlined in paragraph 5.12.

9. Adjust the print head to the platen gap using the instructions outlined in paragraph 5.9.

10. Replace the electro-mechanical assembly according to the trouble-shooting guide, Table 5-1.

            Print head Replacement - 5.8
            Print OK Switch Replacement - 5.10
            Drive Belt Replacement - 5.11

TABLE 5-1. TROUBLESHOOTING GUIDE		
SYMPTOM	POSSIBLE CAUSE	TROUBLESHOOTING PROCEDURE STEPS
1. No Power Indicator (will not paper advance)	1. Blow Fuse 2. Broken Fuse Holder 3. Bad Transformer	1 2,3 2,3,5
2. Will not Paper Advance	1. PIA 2. Solid State Relay 3. Power Switch PCB 4. Print OK Switch	2,3,4 2,3,6 2,3,7 2,3,10
3. Power-Up Unit and Paper Advances Continuously	1. PIA 2. Transistor Array 3. Solid State Relay 4. Print OK Switch	2,3,4 2,3,4 2,3,6 2,3,10
4. Printer does not respond to computer commands (Error 138)	1. PIA 2. MPU 3. Transistor Array	2,3,4 2,3,4 2,3,4
5. Print head moves but will not print	1. Blown Fuse 2. Broken Fuse Holder 3. Bad Transformer 4. Main PCB	1 2,3 2,3,5 2,3,6
6. Incorrect characters being printed	1. ROM 2. PIA	2,3,4 2,3,4
7. Printer Head vibrates in home position	1. Solid State Relays 2. Transistor Arrays 3. PIA	2,3,6 2,3,4 2,3,4
8. Data Transmission Errors	1. Transistor Arrays 2. PIA	2,3,4 2,3,4
9. Dot Missing	1. PIA 2. Transistor Array 3. Driver 4. Print Head	2,3,4 2,3,4 2,3,6 2,3,10

	SYMPTOM		POSSIBLE CAUSE	TROUBLESHOOTING PROCEDURE STEPS
10.	No Power Indicator but Paper Advances	1.	Power Switch PCB	2,3,7
11.	Print Motor Stalls	1.	Excessive Drive Belt Tension	2,3,8
		2.	Defective Motor	Replace Motor, 8
12.	Uneven or Missed Line Feeds	1.	Improper Belt Tension	2,3,8
		2.	Paper Slippage	Clean Platen
		3.	Defective Paper Feed Component	Check Paper Feed Mechanism
13.	Excessive Variation in Character Width	1.	Drive Belt Tension	2,3,8
		2.	Print Head Binding on Guidebar	Clean, Lubricate, 9
		3.	PIA	2,3,4
		4.	ROM	2,3,4
14.	Ribbon catches or snags on Print Head	1.	Incorrect Print Head-to-Platen gap	2,3,9
		2.	Driver Failure	2,3,6

Table caption (above): **TABLE 5-1. TROUBLESHOOTING GUIDE (CONTINUED)**
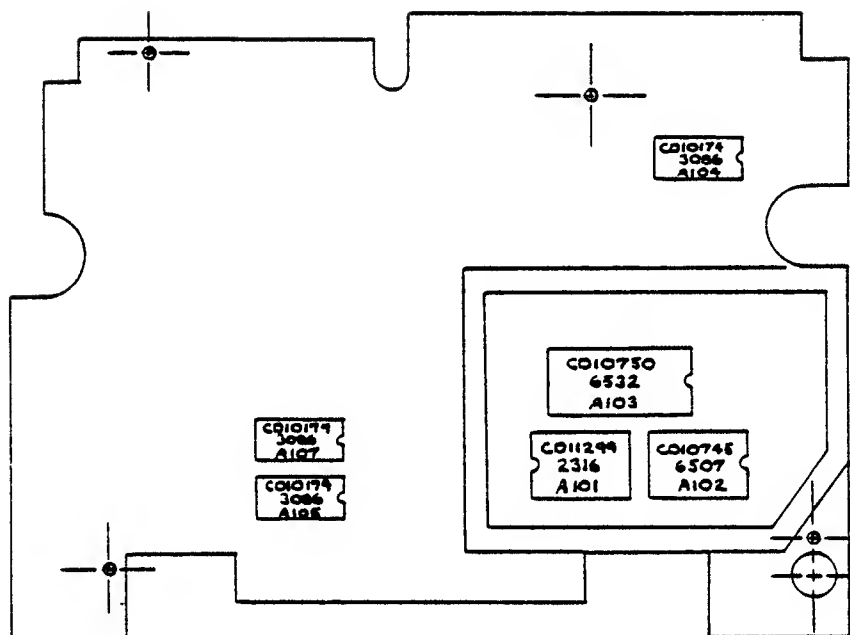
MAIN PCB CHIPPING CHART

Figure 5-4.   Main PCB Chipping Chart

5.5   Chip Replacement

This procedure should be used when troubleshooting the in-
dividual chip on the Main PCB.   Refer to Main PCB Chipping
Chart, Figure 5-4, for chip position on Main PCB.

<u>WARNING</u>

Do not attempt to change a chip with either the

power on or the unit plugged into an outlet.

Procedure:

1.   Remove the noise shield covering the operating
     system integrated circuits.   Bend the 5 tabs
     up and straight, removing the shield.

2.   Begin by replacing the chip suggested by the
     troubleshooting guide.

3.   Retest the unit after each chip is replaced.
     If the print test is being used install a two
     foot length of paper to run the test.

4.   If the suggested chip does not correct the problem
     use the following guide to replace the chips:

     PIA – A103
     MPU – A102
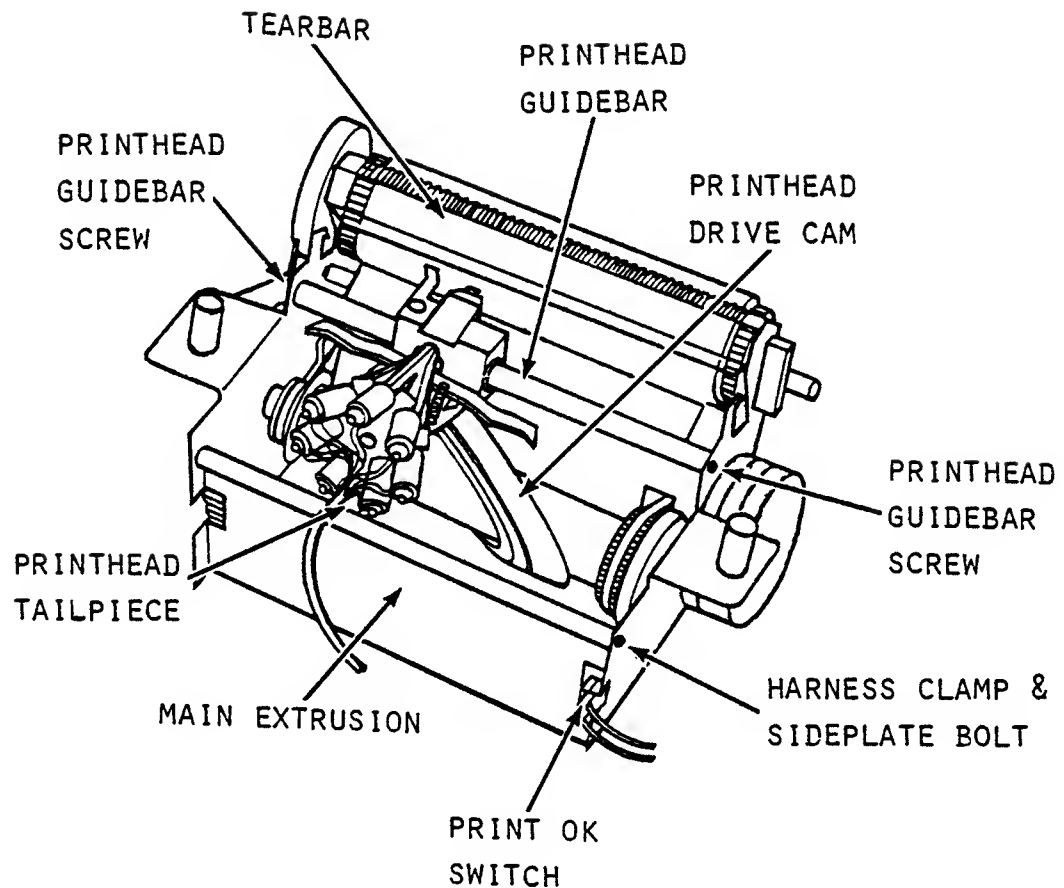   ROM – A101
     Transistor Arrays

Figure 5-5. Print Mechanism-Component Location

5.6 Transformer Replacement

This procedure should be used to replace the transformer.

WARNING

The printer unit should be powered down and power
cord removed from the outlet.

Procedure:

1. Remove the two screws and nuts holding the
   transformer to the common base.

2. Disconnect the harness connector from the
   Printer Main PCB.

3. Plug the new transformer. harness connector into
   the Printer Main PCB.

4. Rest the transformer on the table next to the
   Printer.

5.7 Printer Main PCB Replacement

This procedure should be used to replace the Main PCB.

Procedure:

1. Remove the top housing from the Printer. Refer to paragraph 5.15.1 for the disassembly of the top housing.

2. Use the Main PCB disassembly procedure, paragraph 5.15.2 to remove the Main PCB.

3. Use the Main PCB assembly procedure, paragraph 5.16.2 to install a new Main PCB.

5.8 Print Head Replacement

This procedure should be used when replacement of the print head is required. (Refer to Figure 5.5)

Procedure:

1. Disconnect the print head wiring harness (J102) from the Printer Main PCB.

2. Trace the print head wiring harness back to the harness clamp on the side plate of the printer mechanism.

3. Remove the screw holding the harness to the side plate.

4. Locate and remove the two hex head screws securing the print head guidebar to the sideplate.

5. Lift the print head and guidebar away from the print mechanism, being careful to disengage the print head tailpiece from the guide slot.

6. Lubricate the following items with recommended lubricant:

   o Print head inner sliding bushings

   o Print head tailpiece and tailpiece guide slot

   o Print head drive cam eliptical groove

7. Slide the print head onto the guidebar. The print head should move freely on the bar.

8. Insert the print head tailpiece into the guide slot and lower the print head and guidebar into position. Be sure the metal stub on the underside of the print head is positioned in the slot on the drive cam.
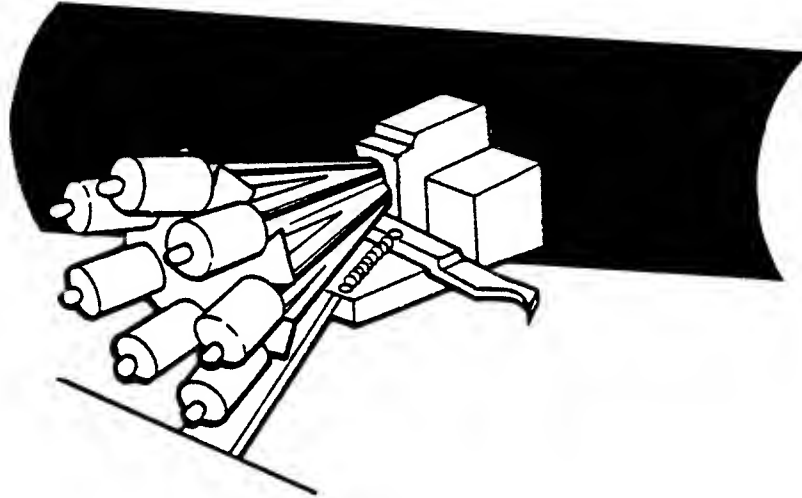
Figure 5-6. Print Head to Platen Gap

9. Install the two 3/6 hex head screws securing the
    guidebar to the side plate. Do not tighten down at
    this time.

10. Refer to the head alignment procedures, paragraph
    5.9.

11. Attach the harness clamp to the print head wiring
    harness.

12. Connect the harness clamp to the side plate on the
    print mechanism.

13. Connect the print head wire harness to the Main
    PCB-J102.

5.9 Print Head Alignment

This procedure should be used whenever the print head is

removed or either hex head screw is loosened.

Tools Required:

    o Feeler Gauge

Procedure:

    1. Be sure the paper roll and ribbon are removed
        from the printer.

    2. Using the feeler gauge measure the print head to
        platen gap at .012" to .015". (Refer to Figure
        5-6)

3. Move the print head across the platen surface ensuring
    the proper gap is maintained.

Rotate the cam towards the platen at all times. Rotating
the cam in reverse direction may damage the Print OK
Switch.

4. When the print head-to-platen gap is uniform between
    .012" and .015", tighten the hex head screws.

5.10   Print OK Switch Replacement

This procedure should be used to replace the Print OK Switch.
(Refer to Figure 5-6)

Procedure:

1. Remove the print mechanism using the disassembly
    procedures, paragraph 5.15.3.

2. Remove the two leads from the microswitch.

3. Locate and remove the 3/16 hex head screw securing
    the print head guidebar to the right side plate.

4. Locate and remove the three screws securing the
    right side plate to the main extrusion.

5. Carefully separate the side plate from the main
    extrusion, just enough to remove the microswitch
    from its position.

6. Insert the new microswitch making sure the foam
    is attached to the switch.

7. Return the side plate to its original position
    against the main extrusion.

NOTE

Be sure the Tear Bar and Drive Cam are correctly positioned
on the side plate.

8. Insert the three screws holding the side plate to
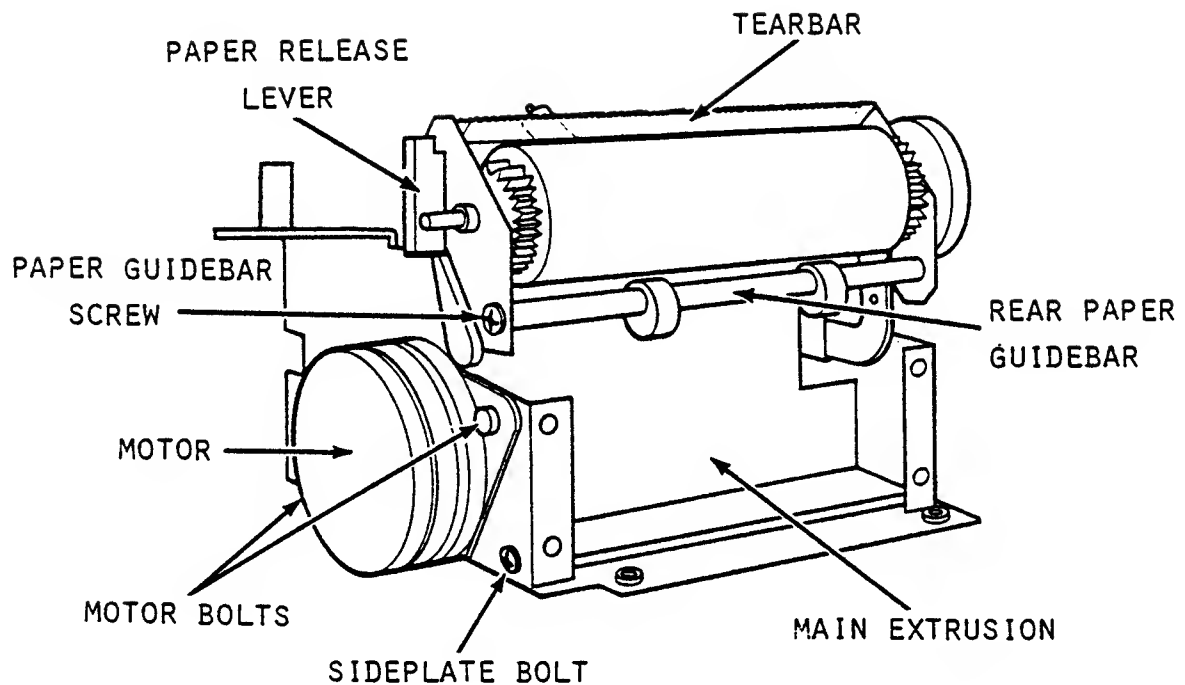   the main extrusion.

Figure 5-7.   Printer Mechanism-Component Location

9.   Align the guidebar with the hole for the hex head
     screw and insert the screw. Refer to Head Alignment
     Procedures, paragraph 5.9, before tightening the screw
     down.

10. If the drive belt slips off either pulley, use the
     procedure to set the belt tension, paragraph 5.12.

11. Assemble the print mechanism to the base plate.
     Refer to paragraph 5.16.1 for the assembly procedure.

5.11 Drive Belt Replacement

This procedure should be used to replace the Drive Belt.
(Refer to Figure 5-6 and Figure 5-7)

     Procedure:

          1.   Disassemble the print mechanism from the base
               plate using the procedure at paragraph 5.15.3.

          2.   Remove the ribbon spools and any paper from the
               print mechanism.

3. Locate and remove the 3/16 hex head screw securing the print head guidebar to the right side plate.

4. Locate and remove the three screws securing the right side plate to the main extrusion.

5. Carefully separate the side plate from the main extrusion. Move the side plate until a gap exists between the side plate and drive cam. The gap should be big enough to insert the drive belt around the drive cam.

6. Insert a new belt around the drive cam.

7. Return the side plate to its original position against the main extrusion.

NOTE

Be sure the Tear Bar and Drive Cam are correctly positioned on the side plate.

8. Insert the three screws holding the side plate to the main extrusion.

9. Align the guidebar with the hole for the hex head screw and insert the screw. Refer to Head Alignment Procedures, paragraph 5.9 before tightening the screw down.

10. Loosen the two screws on the AC Motor and place the drive belt over the drive cam pulley and motor pulley.

11. Adjust the drive belt tension using the procedures in paragraph 5.12.

12. Assemble the print mechanism to the base plate. Refer to paragraph 5.16.1 for the assembly procedure.

5.12 Drive Belt Tension

This procedure should be used for certain print failure and whenever the belt is removed from the pulley or replaced.

Procedure:

1. Locate and slightly loosen the two bolts securing the print motor to the right side plate.
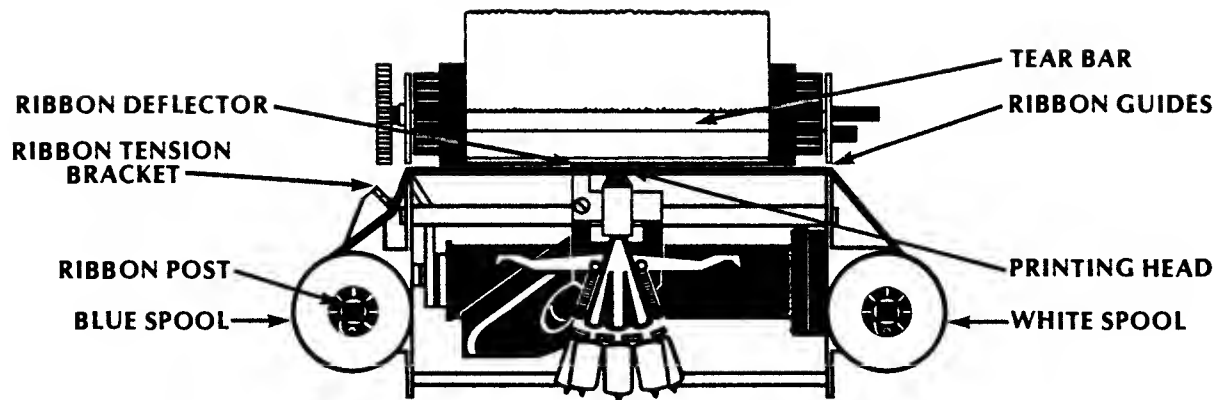
Figure 5-8. Printer Ribbon Installation Guide

2. Position the dirve belt over and around both pulleys.

3. Move the motor forward or backward to achieve proper belt tension.

5.13   Ribbon Installation

This procedure should be used to replace the ribbon.

Procedure:

1. Remove the new ribbon from the package. The white spool should contain the ribbon and the blue spool should be empty.

2. Insert the white spool on the right ribbon post and the blue spool on the left ribbon post.

3. Position the ribbon along the path illustrated in Figure 5-8. The ribbon should be positioned in front of the ribbon tension bracket and around the two ribbon guides.

5.14   Paper Replacement

This procedure should be used whenever the paper needs to be replaced.

WARNING

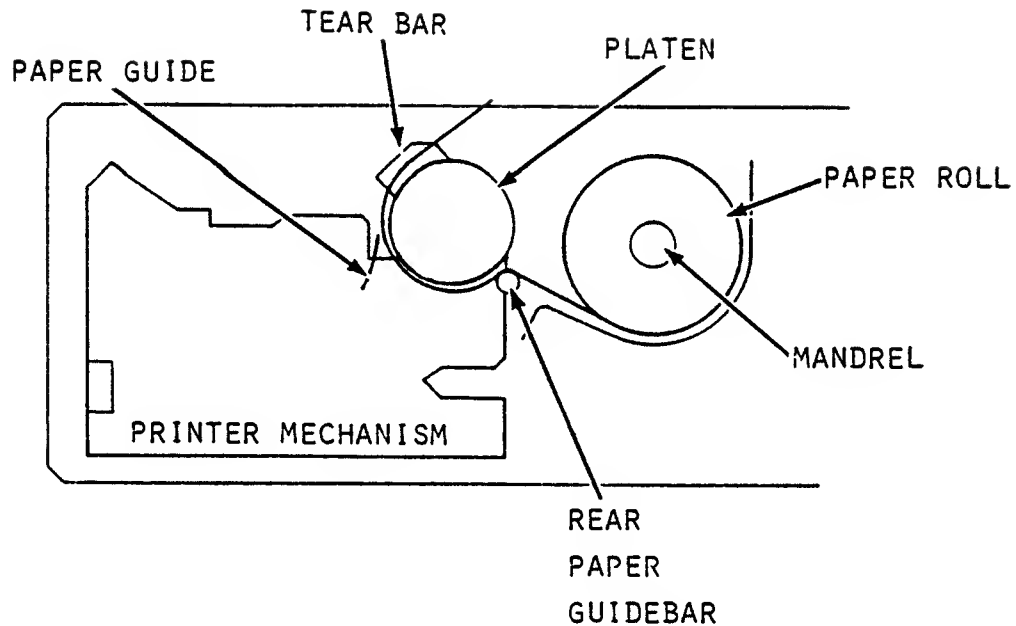Be sure the Power ON/OFF switch is OFF and the print head is in the home position.

Figure 5-9.   Paper Installation Guide

Procedure:

1. Remove the top housing cover from the Printer.

2. Unwind a length of paper which allows the roll to be set on the table while inserting the paper into the mechanism.

3. Insert the paper at the bottom rear of the platen using the nylon bushings as a guide. (Refer to Figure 5-9)

4. Turn the manual paper advance counterclockwise moving the paper through and around the platen. Stop when the paper is about an inch above the tear off bar.

5. Roll the paper up onto the roll and insert the mandrel.

6. Lower the paper into the depression area behind the platen. Be sure the mandrel slips into the guides on each side of the depression.
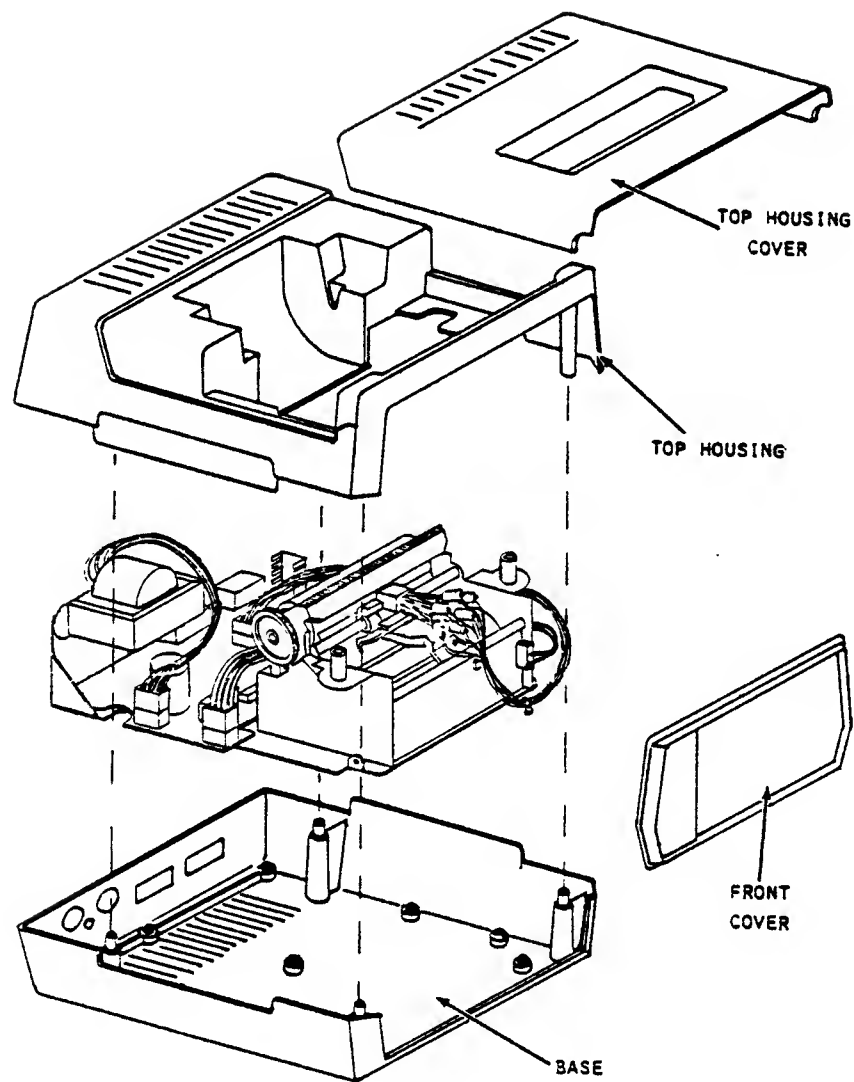
Figure 5-10. Printer Parts-Removal and Assembly

5.15 Disassembly

The disassembly procedure is divided into three levels. These
levels correspond to the different types of components to be
replaced. The three levels of disassembly are: (Refer to Figure
5-10)

- o Top Housing Removal
- o Main PCB Removal
- o Print Mechanism Removal

WARNING

Be sure unit is unplugged before disassembly at any
level.

5.15.1 Top Housing Removal

Procedure:

1. Carefully turn the printer over on the top housing.
2. Remove the four black feet, which expose the case screws.
3. Remove the four screws.
4. Holding the top housing and base together, turn the printer rightside up.
5. Remove the top housing cover exposing the paper and print head.
6. Remove the paper roll and mandrel.
7. Remove the top housing from the base.
8. Lift the front cover up and to the rear of printer.
9. Remove the two screws securing the power switch PCB to the front cover.

CAUTION

Insure that the print head is in the home position on the left side of the printer before installing or removing the paper. Rotate the cam towards the platen to position the print head in the home position.

5.15.2 Main PCB Removal

The top housing should be removed before this procedure is used. Refer to paragraph 5.15.1 to remove top housing.

Procedure:

1. Disconnect the transformer wiring harness from the Main PCB-J108.
2. Remove the two bolts holding the transformer to the base plate. Lift transformer away from the unit.
3. Disconnect all wires and harnesses from the Main PCB. Use the Wiring Diagram Figure 5-11 as a guide.
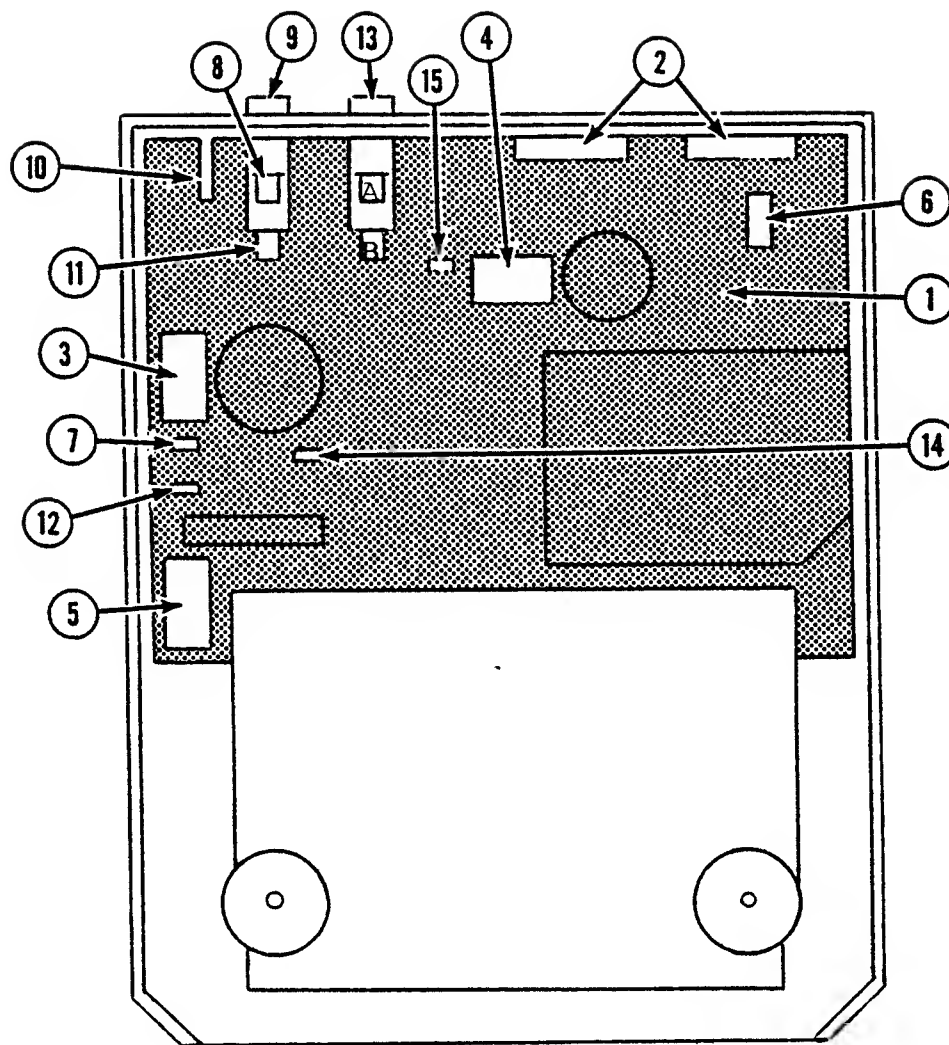
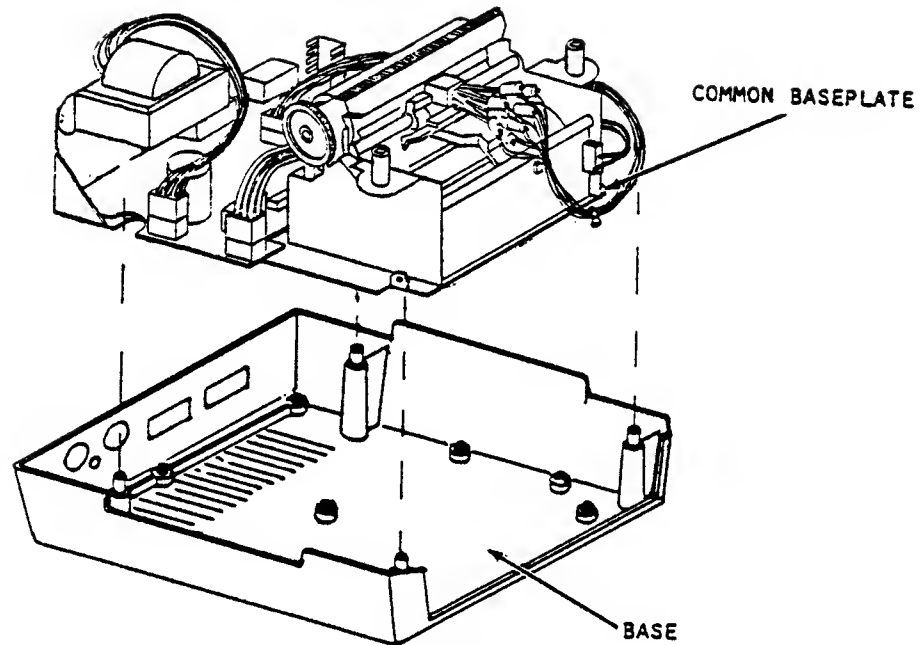|	From	To
Switch Harness	Switch PCB	J101(6) Yellow, Orange, White
	Switch PCB	J109(7) Black
	Switch PCB	Fuse (8) Red
Power Cord	Baseplate	Fuse(11) Black
	Baseplate	J110(12) Black
Fuse Holder	13A	J106(14) Purple
	13B	J107(15) Black
Print Head Harness	Print Head	J102(4)
Motor and Micro-Switch Harness	AC Motor	J108(5)
	Micro-switch	
Transformer Harness	Transformer	J105(3)

Figure 5-11. Wiring Connection

Figure 5-12. Base and Common Baseplate Removal

4. Locate and remove the four screws holding the Main PCB to the base plate.

5. Carefully lift the Main PCB at an angle, raising from the side nearest the print mechanism.

CAUTION

Be careful not to damage the two fuse connectors when removing the Main PCB.

5.15.3 Printer Mechanism Removal

The top housing should be removed before this procedure is used. Refer to paragraph 5.15.1 to remove top housing.

Procedure:

1. Remove the two fuses from the rear of the printer base plate.

2. Locate and remove the eight screws securing the base plate to the plastic base.

3. Lift the base plate and print mechanism from the base. (Refer to Figure 5-12)

4. Remove the ribbon spool and any paper. (if present)

5. Disconnect the print head harness from the Main PCB-J102.

6. Disconnect the Motor/Switch Harness from the Main PCB-J108.

7. Turn the base plate on its side to locate and remove the three screws securing the printer mechanism to the base plate.

8. Set the base plate rightside up removing the print mechanism.

5.16 Assembly

The Assembly procedure is also divided into three levels like the Disassembly Procedure. The three levels of reassembly are: (Refer to Figure 5-10)

o Print Mechanism Assembly

o Main PCB Assembly

o Top Housing Assembly

WARNING

Be sure unit is unplugged before reassembling to any level.

5.16.1 Print Mechanism Assembly

Procedure:

1. Place the print mechanism on the base plate, aligning the three holes for the screws.

2. Turn the base plate on its side holding the print mechanism to the base plate.

3. Insert the three screws from the bottom, being sure they are tightly secured.

4. Connect the Motor/Switch Harness to the Main PCB-J108.

5. Connect the print head harness to the Main PCB-J102.

6. Place the base plate and print mechanism back into the plastic base. Be sure all the rubber mounts are in place on the base. (Refer to Figure 5-12)

7. Replace the eight screws holding the base plate to the base.

8. Insert the two fuses into their holder and secure the caps.

5.16.2 Main PCB Assembly

Procedure:

1. Place the main PCB at an angle towards the rear of the printer. Carefully lower the Main PCB until it is flush on the base plate.
2. Replace the four screws holding the Main PCB to the base plate.
3. Connect all wires and harnesses to the Main PCB. Use the wiring diagram Figure 5-11 as a guide.
4. Connect the transformer wiring harness to the Main PCB-J108.
5. Align the transformer on the base plate and replace the two screws and nuts.

5.16.3 Top Housing Assembly

Procedure:

1. Align the power switch PCB on the front cover and replace the two screws.
2. Place the front cover into the guides on the base and lower into position.
3. Place the top housing over the exposed Main PCB and print mechanism, until the base and top housing are flush together.
4. Holding the top housing and base together, turn the unit over on the top housing.
5. Replace the four screws holding the top cover to the base.
6. Replace the four black feet over the exposed case screws.
7. Turn the printer unit rightside up.
8. Install the ribbon spools in the printer. Refer to paragraph 5.13 on how to install the ribbon.
9. Install the paper roll and mandrel in the printer. Refer to paragraph 5.14 on how to install the paper roll.

CHAPTER 6 - SPARE PARTS LIST AND ORDERING/REPORTING INFORMATION

6.1 Introduction

The following paragraphs will provide information on ordering
parts, Failure Reports and a listing of components used in the
ATARI 820 Printer.

6.2 Ordering Parts

To order parts, refer to the Service Center Manual for avail-
able parts and pricing.

6.3 Failure Reports

The Service Center Manual provides a detailed description of
failure reporting procedures. Insure that care is taken to
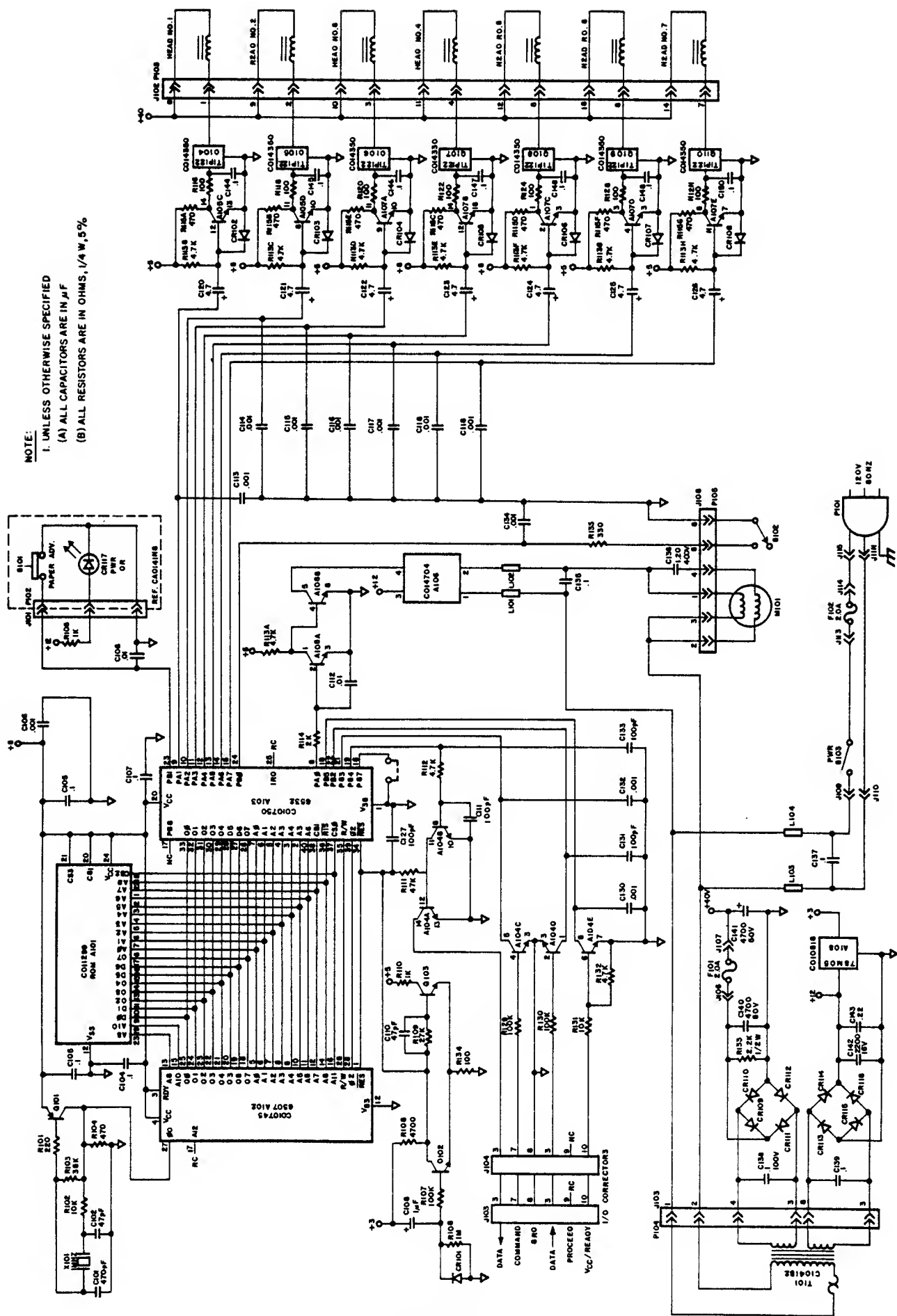complete all forms properly and timely filed.

6.4 Parts List

The following is a list of the major components used in the
ATARI 820 Printer.

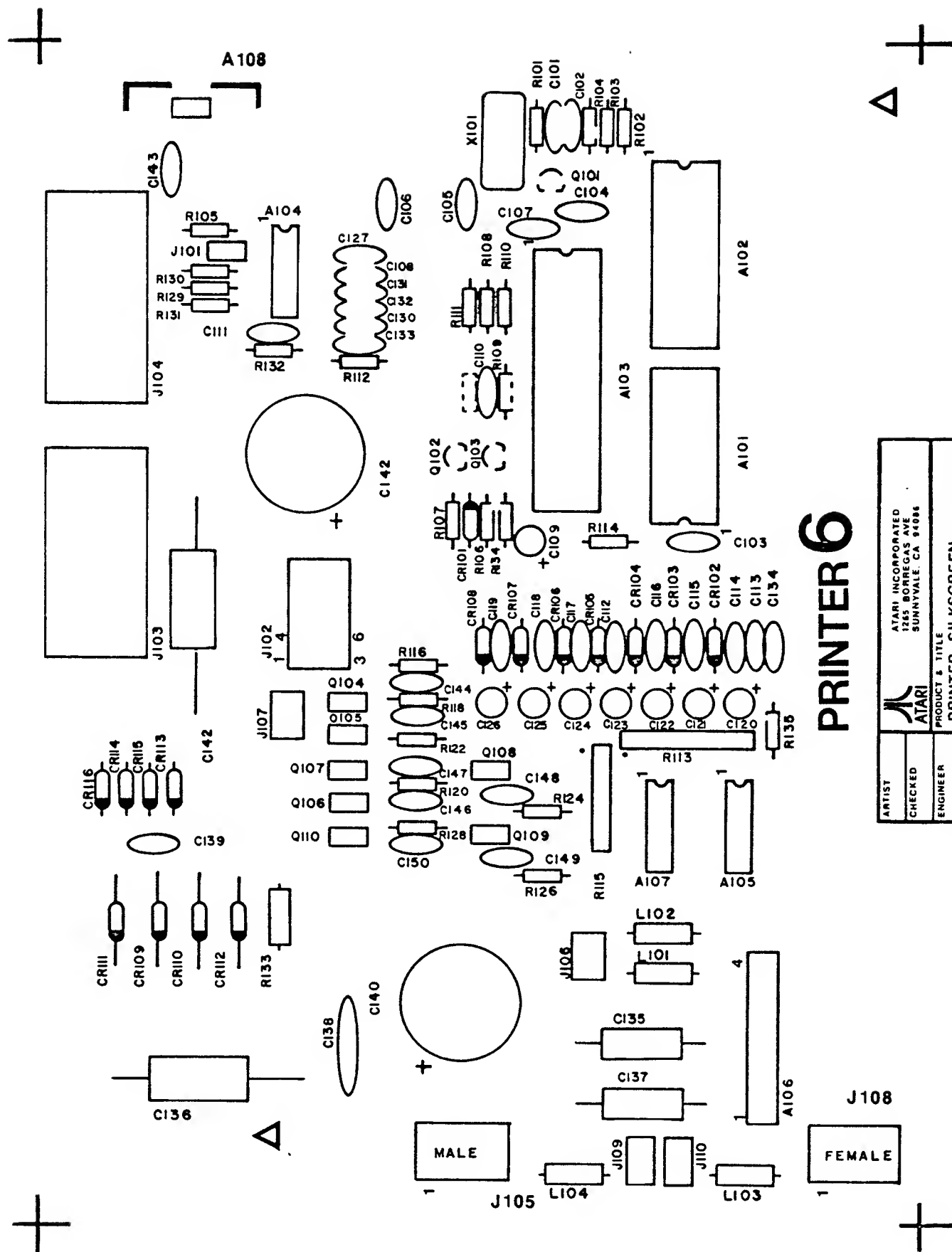| PARTS DESCRIPTION	ATARI Part #
POWER SWITCH PCB ASSY.	CA014166
PCB	C012979
MOMENTARY SWITCH (S101)	CA011620-01
POWER SWITCH (S103)	C014831
L.E.D. (CR117)	C014777
L.E.D. STANDOFF	C014069
3 PIN HEADER (P102)	79-58104
POWER & ADVANCE CABLE ASSY.	CA014792
ADVANCE BUTTON (PLASTIC)	C014056
SCREWS (2) #6x3/8 BT PHIL HD	82-AL606

PART DESCRIPTION	ATARI PART #
COMMON BASEPLATE ASSY.	CA014168
COMMON BASEPLATE	CO12977
BASEPLATE INSULATOR	CO14326
MAIN PCB ASSY.	CO14326
SCREWS (4) #6-32x1/4 PHIL HD	72-16045
LOCKWASHERS (4) #6 SPLIT RING	75-046
FUSE HOLDER ASSY. (F101)	CAO14838
FUSE HOLDER (F101/F102)	CO14783
TRANSFORMER (T101) ASSY.	CO14182
SCREWS (2) #8-32x3/8 PHIL HD	72-18065
NUTS (2) #8-32 STD	75-9185
LOCKWASHERS (2) #8 SPLIT RING	75-048
PRINTER MECHANISM	CAO14702
SCREWS (3) #8-32x3/8 PHIL HD	72-18065
LOCKWASHERS (3) #8 SPLIT RING	75-048
POWER CORD ASSY.	CAO14784
STRAIN RELIEF BUSHING	78-2115
SCREW (1) #6-32x5/16 THD PHIL HD	72-CL605
PRINTER CASE	
FRONT PANEL	CO12975
LOGO LABEL	CO14039
NAME PLATE LABEL	CO14084
TOP HOUSING COVER	CO12974
TOP HOUSING	CO12973
PAPER ROLL LABEL	CO14713
BASE	CO12972
RUBBER ISOLATION WASHERS(8)	88-1010
SCREWS (8) #6-32x1/2 BT PHIL HD	82-AL608
SCREWS (4) #6-32x3/4 SHT MTL PHIL HD	75-AL612
RUBBER FEET (4)	8801004
CONNECTOR LABEL	CO14087
PAPER ROLL	CO14062
PAPER MANDREL	CO14853
RIBBON SPOOL	CO14854
PRINTER OPERATORS MANUAL	CO14762

6.5   Print Mechanism Parts List

APPENDIX A

PRINTER SCHEMATIC

APPENDIX B

PRINTER SILKSCREEN

PRINTHEAD HARNESS CONNECTOR

Pin layout (Plug - Board Side):

```
( 1 )  ( 2 )  ( 3 )
( 4 )  ( 5 )  ( 6 )
( 7 )  ( 8 )  ( 9 )
(10 )  (11 )  (12 )
(13 )  (14 )  (15 )
```
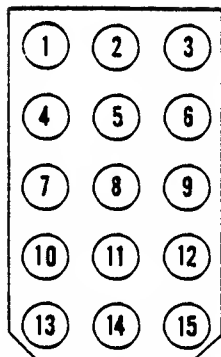
(Plug - Board Side)

PINS	SOLENOID
1,8	1
2,9	2
3,10	3
4,11	4
5,12	5
6,13	6
7,14	7

PRINTHEAD HARNESS CONNECTOR

PRINT MOTOR/PRINT OK SWITCH HARNESS CONNECTOR

Pin layout (Plug—Board Side):

```
[ 3 ]    ( 6 )
( 2 )    [ 5 ]
[ 1 ]    ( 4 )
```
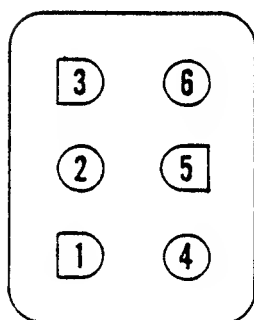
(Plug—Board Side)

PINS	LEAD	
1,2	BLACK	MOTOR
3,4	WHITE	
5	BLUE	SWITCH
6	RED	

**PRINT MOTOR/PRINT OK SWITCH
HARNESS CONNECTOR**

APPENDIX C

HARNESS CONNECTORS

Yellow
PWR ON Lite
PWR Switch
White
PAPER ADV. Switch
Red
Black
POWER SWITCH PCB
White
Yellow
MAIN PCB (right rear corner)

POWER SWITCH PCB HARNESS

REDUCE TO 3.075 INCHES

AC AC CO12979 REV 5

ATARI

PRINTER SWITCH BOARD
CO12979

APPENDIX D

POWER SWITCH PCB HARNESS

PRINTHEAD

DRIVE MOTOR

PAPER FEED
ECCENTRIC & PAWL

PRINTHEAD SLOTTED
DRIVE CAM

PRINT OK
MICROSWITCH

DRIVEBELT

APPENDIX E: PRINT MECHANISM ASSEMBLY

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A Warner Communications Company Ⓦ